

Photographs

TRANSPORTATION LIBRARY

MAY 31 1984

NORTHWESTERN UNIVERSITY



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7100 - 7224

Chicago Transit Authority
Equipment Engineering
& Maintenance Department
July, 1984

Photographs

TRANSPORTATION HISTORY

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BUS SERIES 7100 - 7224
INFORMATION PERTAINING TO AIR CONDITIONED
ARTICULATED DIESEL ENGINE BUSES



Bus Manufacturer	M.A.N. Truck and Bus Corp.
Model Number	SG220-10255 U.S.
Number of Buses	125
Seating Capacity	66
Date Received	1982-1983
Height	122.4 Inches
Width	102 Inches
Weight	36,190 lbs.
Left over Bumpers	55 ft.
Body turning Radius	42.68 ft.
Inner turning Radius	25.18 ft.
Trailer Swing out	24 inches

WHEEL BASE

Front Axle to Drive Axle	222.437 inches
Drive Axle to Trailer Axle	255.5 inches
Total Wheel Base	477.937 inches

BODY OVERHANG INCLUDING BUMPER

Front	105 inches
Rear	77.375 inches
Horizontal Hinge Angle	32°
Vertical Hinge Angle	11°
Angle of Approach	8°
Angle of Departure	8°

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7224

DOOR CLEAR OPENING

Front (including grab handles)	41 inches
Rear	40 inches
Front Door Type	Slide Glide
Rear Door Type	Touch Bar Plug

ENGINE MAIN

Manufacturer	M.A.N. AG
Type	Diesel 6 Cylinder in line Turbocharged intercooled
Model Number	D 2566 MTUM
Net S.A.E. Horsepower	305 at 2200 rpm
Net S.A.E. Torque	846 lb. ft.
Weight Dry	2008 lbs.

TURBO CHARGER

Make & Type	KKK 4LGZ352C 30.22
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TRANSMISSION

Manufacturer	Renk A.G.
Type	Doromat
Model Number	D 874A
Speeds	Four forward one reverse two braking

GEAR RATIOS

Forward	9:1 max. 3.6:1 max 1.4:1 1:1
Reverse	7:1 max.

SHIFT SPEEDS

1st - 2nd	12.2 mph
2nd - 3rd	25.9 mph
3rd - 4th	40.3 mph
Top Speed	57 mph

ALTERNATOR

Manufacturer	Delco Remy
Type	600 - 24 volt
Model	Series 50 DN
Maximum Output Rating	270 amp
Output at Idle (depending on battery charge)	185-195
Maximum Warranty Speed	7296 rpm Eng. rpm 2400
Idle Speed	1824 rpm
Drive Type	V-Belt
Voltage Regulator	Delco
Model Number	111 8437
Batteries	Die Hard

STARTER MOTOR

Manufacturer	R. Bosch
Type	KB-24V (6.5 KW)

AIR COMPRESSOR

Manufacturer	M.A.N. AG
Type	51,99447.0071 - 2 Cyl.
Capacity at Idle	4.7 cfm
Capacity at Maximum Speed	20.5 cfm
Drive Type	Gear
Maximum Warranted Speed	2073 rpm
Idle Speed	475 rpm

AIR LINE COLOR CODE

Blue	Front Axle Brakes
Red	Drive Axle Brakes

Brown	Trailer Axle Brakes
Grey	Park Brake
Yellow	Suspension
Black	Accessories
Green	Compressor Discharge Line

AXLE FRONT

Manufacturer	M.A.N. AG
Type	Independent
Model Number	V-7 70SL
Gross Axle Weight	16,534 lbs.

AXLE DRIVE CENTER

Manufacturer	M.A.N. AG
Type	Planetary Drive
Model Number	HO7-10120
Gross Axle Weight Rating	24,250 lbs.
Axle Ratio	1:5.22 (1:594)
Final Drive	4.639

AXLE TRAILER

Manufacturer	M.A.N. AG
Type	Independent
Model Number	HN7-70SL
Gross Axle Weight Rating	16,534 lbs.

STEERING POWER

Pump	ZF 8065 900 216
Type	7674 955138 Gear
Relief Pressure	1450 psi



BRAKES

Make of Fundamental Brake System

M.A.N. AG

BRAKE CHAMBERS

Front Axle

Diaphragm Type 24

Drive (center) Axle

Tristop cyl. 30/30

Trailer (rear) Axle

Diaphragm cyl. Type 20

SLACK ADJUSTERS

Front Axle

SAB Type 847

Drive Axle

SAB Type 857

Trailer

SAB Type 847

BRAKE DRUMS

Front Axle Drive Axle & Trailer Axle

Manufacturer

M.A.N. AG

Dia. Front, Drive & Trailer

16.14

Part Number

Front & Trailer

81.50110.0147

Drive Axle

81.50110.0144

BRAKE SHOES

Manufacturer

M.A.N. AG

BRAKE BLOCK

Manufacturer

Jurid 124

BRAKE BLOCK WIDTHS

Front Axle

6.3 inches

Drive Axle

8.7 inches

Trailer Axle

6.3 inches

BRAKE BLOCK LENGTHS

Front Axle	12.56 in.
Drive Axle	12.56 in.
Trailer Axle	12.56 in.

Brake Block Thickness

0.67 in.

BRAKE BLOCK AREA PER AXLE

Front	392 sq. in.
Drive	447 sq. in.
Trailer	392 sq. in.

FUEL TANK CAPACITY

Diesel Fuel	125 gal.
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COOLING SYSTEM

Radiator

Manufacturer	Longever & Reich Stuttgart Germany
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Type	Tube
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Model Number	1.1642.2.10
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Surge Tank Capacity	3.2 gal.
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Total Cooling & Heating Capacity	15.85 gal.
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Engine Thermostat Setting	180°F
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Engine Overheat Alarm Temperature Switch Setting	198°F
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Radiator Fan & Speed Control	Visco Type
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Auxiliary Radiator	Part No. 1.16432.50.1
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Manufacturer	Longever & Reich Stuttgart Germany
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AUXILIARY FAN MOTORS

Manufacturer	Borsch
Type	Permanent Magnet
Speed	Nominal 2600 rpm

INTERIOR LIGHTING

Manufacturer	Luminator
Ballast	Triad-Utrad.
Lens Material	Polycarbonate

TIRES

Manufacturer	Michelin Tubeless Radial
Size	315/80 R225
Load Range	18PR LRJ
Coaches	7100-7174

TIRES

Manufacturer	Goodyear Radial
Size	315-75R 22.5
Load Range	18PR LRJ
Coaches	7175-7224

HEATING, A/C & VENTILATING EQUIPMENT

Engine Drive	
Manufacturer	Perkins Diesel Engine
Model Number	4.154
Number of Cylinders	4
Bore	3.5
Stroke	4.0
Displacement	154 cu. in.
Net SAE Horsepower	45.6 at 2200 rpm
Net SAE Torque	110 lbs. ft. at 2200 rpm

RADIATOR

Manufacturer	Trane
Type	Fin & Tube
Fins per Inch	9

COMPRESSOR

Manufacturer & Model	Trane Crog - 1500
Number of Cylinders	4
Drive Ratio to Perkins Engine	1:1
Maximum Warranted Speed	3600 rpm
Operating Speed - High	2200 rpm
- Low	1800 rpm

REFRIGERANT

Type	R 22
System Capacity	33 lbs.

CONDENSER

Manufacturer	Trane
Type	Fin & Tube
No. Rows Tubes	4
No. Fins Per Inch	9

CONDENSER FAN

Manufacturer & Model	Trane
Fan Diameter	20 in.
Speed Maximum	3000 rpm
Flow Rate (maximum)	8600 cfm

RECEIVER

Manufacturer & Model	Trane 6" dia. x 12" long
Capacity	8 lbs.

EVAPORATORS

Manufacturer	Trane "Trans Flow"
Tubes No. of Rows	3
No. of Fins/Inches	12
Number of Evaporators	4

DRIVERS HEATER EVAPORATOR

Manufacturer	Trane
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EXPANSION VALVES

Manufacturer & Model	Alco TCLE SHW-85
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FILTER DRIER

Manufacturer & Model	Alco ADK 415
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HEATER CORES

Manufacturer & Model	Trane Trans Flow
Number of Rows	2
Fins Per Inch	12
Number of Coves	4

HEATER BLOWERS

Manufacturer	Trane Bi Wheel
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BLOWER MOTORS

Manufacturer	Ohio
Model	C 481232X7755
Type	Permanent Magnet

Horsepower	.8
Speed	2275 rpm

CONTROLS

Manufacturer	Trane
Type	Solid State

DRIVERS HEATER MOTORS

Manufacturer	Owosso Products
Maximum Speed	3600 rpm

7100 SERIES PHOTO & COMPONENT IDENTIFICATION

EXTERIOR VIEWS

PHOTO
NUMBER

- | | |
|-----|---|
| 1 | Right side oblique view front to rear of bus |
| 2 | Left side oblique view front to rear of bus |
| 3 | Right front including entrance door area |
| 4 | Right side oblique view front to rear with bus in right turn articulation |
| 5 | Right side oblique view front to rear with only partial view of trailer |
| 6 | Left side trailer view with bus in right turn articulation |
| 7 | Front view |
| 8 | Roof view front to rear |
| | 1) Radio antenna |
| | 2) Roof vent hatch cover |
| | 3) Power vent |
| | 4) Roof emergency egress hatch |
| 9 | Roof view rear to front |
| 10 | Articulation bellows divider support (5) divider support |
| 11 | Driver's heater access door closed with windshield wiper arm assemblies and mirrors visible |
| 12 | Driver's heater access door open |
| | 6) Driver's heater defroster assembly |
| | 7) Access door gas cylinder prop |
| 12A | Driver's heater defroster left side access to wire junction terminals and mechanical controls |
| 13 | Exterior view windshield wiper motors above heater defroster assembly |
| | 8) Blower motor access cover |
| | 9) Wiper motors |
| | 10) Windshield flexible defroster hoses |
| | 11) Heater defroster fresh air filter |

PHOTO
NUMBER

- 14 Rear view with A/C access door closed
- 15 Rear view with A/C access door open
- 16 Main electrical control panel access door closed
- 17 Auxiliary radiator compartment beneath main electrical control panel grill door closed
- 18 Main electrical control panel access door open
- 19 Main electrical control panel component identification
 - 12) Compartment ON/OFF light switch
 - 13) Passenger stop relay
 - 14) Turn left signal relay
 - 15) Turn right signal relay
 - 16) Shift interlock relay
 - 17) Engine fast idle relay
 - 18) Horn relay
 - 19) Back-up light relay
 - 20) Turn signal indicator relay
 - 21) Dome lights left side relay
 - 22) Dome lights right side relay
 - 23) Radiator auxiliary fan motor relay
 - 24) Alternator discharge light relay
 - 25) Power roof vents relay
 - 26) 0105 bus relay
 - 27) Radio 12 volt relay
 - 28) Driver's heater defroster blower motor relay
 - 29) Starter voltage regulator circuit breaker - 8 amp
 - 30) Gauges circuit breaker - 8 amp
 - 31) Door actuator stepwell light circuit breaker - 8 amp
 - 32) Stop request sign circuit breaker - 8 amp
 - 33) Turn signal & hazard lights circuit breaker - 8 amp
 - 34) Driver's heater defroster motor circuit breaker - 16 amp
 - 35) Auxiliary radiator fan motor circuit breaker - 16 amp
 - 36) Air dryer heat element circuit breaker - 8 amp
 - 37) Roof power vent motors circuit breaker - 16 amp
 - 38) Trane heater box circuit breaker - 25 amp
 - 39) Front destination sign motor circuit breaker - 8 amp
 - 40) Door actuator circuit breaker - 8 amp
 - 41) PA System amplifier circuit breaker - 8 amp
 - 42) Horn, stop and back-up light circuit breaker - 8 amp
 - 43) Dome lights right side circuit breaker - 16 amp
 - 44) Domelights left side circuit breaker - 16 amp
 - 45) Destination sign light circuit breaker - 8 amp
 - 46) Driver's light circuit breaker - 8 amp
 - 47) Tail and license plate light circuit breaker - 8 amp

PHOTO
NUMBER

- 19 Main electrical control panel component identification - (Cont'd.)
- 48) Clearance lights and instrument light circuit breaker - 8 amp
 - 49) Curb lights circuit breaker - 8 amp
 - 50) Head lamp circuit breaker - 16 amp
 - 51) Door override diodes
 - 52) Transmission circuit breaker - 2 amp
 - 53) 150 bus relay
 - 54) Multiple diode assemblies
 - 55) PA System amplifier
 - 56) Transmission printed circuit control board
 - 57) PA System external plug for microphone
 - 58) Brake interlock and radio diodes
 - 59) Turn flasher
 - 60) Radio 12 volt relay
 - 61) Accelerator interlock relay
 - 62) Spring brake interlock relay
 - 63) Spring brake interlock relay
 - 64) Door override II relay
 - 65) Door override II relay
- 20 Auxiliary radiator with fan motors
- 21 Engine oil filler pipe
- 66) Engine oil fill pipe
 - 67) Engine oil level dipstick
- 22 Close-up engine oil fill pipe and oil level dipstick
- 23 Battery and voltage regulator compartment door open
- 24 Battery compartment
- 68) Battery circuit disconnect switch
- 25 Battery disconnect switch and alternator protection switch
- 69) Alternator protection switch in the event the battery switch is activated to OFF with engine running
- 26 Battery disconnect switch and engine oil filler pipe
- 27 Voltage regulator compartment and engine oil filler pipe
- 28 Voltage regulator compartment
- 70) Compartment light ON/OFF switch
 - 71) A/C starter circuit breaker

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- 28 Voltage regulator compartment - (Cont'd.)
- 72) Voltage regulator
 - 73) Heater box left front circuit breaker
 - 74) Heater box right front circuit breaker
 - 75) Heater box left rear circuit breaker
 - 76) Heater box right rear circuit breaker
 - 77) Main circuit breaker
 - 78) Booster pump front relay
 - 79) Booster pump rear relay
 - 80) Radio run 12 volt relay
 - 81) HVAC system generator relay
 - 82) Starter interlock relay
 - 83) Engine stop relay
 - 84) Turn signal circuit breaker - 25 amp
 - 85) Engine compartment light circuit breaker - 8 amp
 - 86) Engine cold start circuit breaker - 25 amp
 - 87) Radio 12 volt circuit breaker - 30 amp
 - 88) Farebox 12 volt circuit breaker - 16 amp
 - 89) Booster pump front (tractor) circuit breaker - 16 amp
 - 90) Booster pump rear (trailer) circuit breaker - 16 amp
 - 91) HVAC system (CKT229) circuit breaker - 8 amp
 - 92) Engine cold start relays
 - 93) Engine cold start bi-metal switch
 - 94) Starter interlock module
 - 95) Starter interlock capacitor and diode
- 29 Battery equalizer compartment
- 96) Voltage equalizer
 - 97) Fuel heater diode
 - 98) Fuel heater relay
 - 99) Fuel heater circuit breaker - 60 amp
 - 100) Fuel heater five minute timer
- 30 A/C Condenser grill door closed
- 31 A/C Condenser grill door open
- 101) Ambient sensor switch
 - 101a) Starter protection switch
- 32 Entrance doors closed
- 33 Entrance doors open
- 34 Close-up view entrance doors open
- 35 Entrance doors open with interior view of stepwell, radio box and driver's seat

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- 36 Entrance door stepwell
- 37 Engine compartment and surge tank access doors closed
- 38 Engine compartment door open
- 39 Engine compartment door open identifying components
 - 102) Mechanically operated prime fuel pump
 - 103) Fuel filter separator
 - 104) Engine emergency shutdown fuel solenoid valve
 - 105) Engine fuel filters
 - 106) Engine air filters
 - 106a) Engine air filter minder
 - 107) Engine air filter intake seal to compartment door
- 40 Engine compartment door open
 - 108) Fuel heater line connection
- 41 Close-up fuel system in engine compartment and fuel heater line installed before bus outside skin applied
 - 109) Fuel heater line installed
- 42 Surge tank compartment door open
 - 110) Engine automatic oil level reservoir
 - 111) Reservoir oil level sight glass
 - 112) Surge tank filler cap with manual pressure release
 - 113) Surge tank automatic pressure release
 - 114) Power steering oil reservoir
 - 114a) Surge tank coolant sight glass
- 43 Exit doors closed
- 44 Close-up exit doors closed
- 45 Exit doors open
- 46 Exit door stepwell
- 47 Fuel tank filler pipe
- 48 A/C Compressor door and A/C engine air inlet
- 49 A/C Compressor access door open
 - 115) A/C Engine fuel filter
 - 116) Suction pressure safety switch engine shutdown

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- 49 A/C Compressor access door open - (Cont'd.)
- 117) Discharge high pressure safety switch engine shutdown
 - 118) Compressor oil pressure safety switch engine shutdown
 - 119) Suction line to accumulator
 - 120) Pressure freon line
 - 121) A/C engine supply and return fuel lines
- 50 A/C Unit installed
- 122) A/C Engine high speed switch
 - 123) A/C Engine low speed & shutdown switch
 - 124) A/C Engine air filter
 - 125) A/C Engine air filter minder
- 51 A/C Unit assembly compartment air filter installed
- 52 A/C Engine air filter blow up

A/C UNIT ASSEMBLY AND INSTALLATION

- 53 Backside of A/C unit assembly
- 126) Mini generator to prevent starter engagement with running engine
 - 127) Heat shield to protect mini generator
 - 128) Coolant temperature gauge probe in cylinder head
 - 129) Low coolant indicator switch engine safety shutdown
 - 130) Quick fill engine oil level flex line
 - 131) Fan blade belt adjusting idler pulley
 - 132) Coolant reservoir for A/C engine radiator
 - 133) Freon accumulator
- 54 A/C Engine and compressor
- 134) Engine crankcase breather
- 55 A/C Engine backside
- 56 A/C Compressor view
- 135) Bus back-up alarm horn
- 57 A/C Assembly view as seen at rear of bus
- 58 A/C Engine and compressor assembly as viewed at rear of bus
- 136) A/C Engine oil heat exchanger
 - 137) A/C Engine fuel injection pump
 - 138) A/C Engine starter

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- 59 A/C Unit completed assembly installed
- 60 A/C electrical control panel
- 139) Automatic start ON/OFF switch
 - 140) A/C Rear start switch
 - 141) Front OFF rear start switch
 - 142) Service lamp switch
 - 143) Blower motors solenoid switch
 - 144) starter solenoid switch
 - 145) Low water sensor
 - 146) Time delay start
 - 147) CR1 Relay high-low pressure protection
 - 148) CR2 Relay oil and low coolant protection
 - 149) Priming fuel pump switch
 - 150) Unit hourmeter
 - 151) A/C Engine oil pressure gauge
 - 152) A/C Engine coolant temperature gauge
 - 153) A/C Fail warning light
- 61 A/C Engine close-up as viewed at rear of bus
- 62 A/C Compressor door open close-up view
- 63 A/C Unit installed condenser door open
- 64 A/C Condenser compartment
- 154) A/C Freon receiver and sight glass
 - 155) A/C Freon filter dryer
 - 156) Freon shut-off valves for filter service
- 65 A/C Bottom side view exhaust system
- 66 A/C Bottom rear view exhaust system

BUS INTERIOR COMPLETED

- 67 Front destination sign compartment access door open
- 68 Destination sign compartment door open right side view
- 157) Exit door master switch
- 69 Destination sign compartment door open left side of view
- 158) Destination sign roller curtain motor
 - 159) Communication speaker

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- 70 Destination sign compartment door open
- 71 Fire extinguisher bracket location
- 160) Fire extinguisher bracket
 - 161) Exit door sensitive edge & emergency alarm bell
 - 162) Head lamp dimmer switch
- 72 Driver's heater defroster assembly & farebox area
- 73 Close-up driver's heater defroster assembly
- 74 Side console
- 163) Emergency engine shutdown switch
 - 164) Fuel heater five minute switch
 - 165) Roof power vent switch
 - 166) Driver's overhead light switch
 - 167) Interior lights
 - 168) Passenger signal ON/OFF switch
 - 169) Fast idle switch
 - 170) Exit door touch bar override switch
 - 171) Exit door panel selector
 - 172) Entrance door panel selector
 - 173) Fuel heater five minute override switch
 - 174) Fuel heater on indicator light
- 75 Forward portion of side console
- 175) Park brake ON/OFF valve
 - 176) Adjustable air flow ball
 - 177) Door operating control handle
 - 178) Entrance door dump valve
- 76 Driver's instrument panel
- 179) Tractor front & drive axle brake reservoir air pressure gauge
 - 180) Trailer axle brake air reservoir pressure gauge
 - 181) Instrument panel light test switch
 - 182) Hazard light switch
 - 183) Turn indicator light switch
 - 184) Low coolant warning light
 - 185) Engine temperature warning light
 - 186) Engine low oil pressure warning light
 - 187) Turn indicator left turn indicator light
 - 188) Speedometer
 - 189) Alternator discharge warning light
 - 190) Hi-beam head lamp indicator light
 - 191) Stop light indicator light
 - 192) Low air pressure warning light

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- 76 Driver's instrument panel - (Cont'd.)
- 193) Park brake warning light
 - 194) Hinge angle exceeded warning light
 - 195) Turn indicator right turn indicator light
 - 196) Transmission temperature warning light
 - 197) Starter switch
 - 198) A/C fail warning light
 - 199) Rear door unlock indicator light
 - 200) Instrument panel lights reostat switch
 - 201) Master run switch
 - 202) Cold start switch and indicator light
- 77 Driver's instrument panel right side
- 203) Left wiper control valve
 - 204) Right wiper control valve
 - 205) Transmission speed selector
 - 206) Transmission lock out switch reverse & 4th speed
 - 207) Retarder OFF warning light
 - 208) Retarder ON/OFF switch
 - 209) Engine radiator auxiliary fan motors
 - 210) Driver's heater defroster ON/OFF switch
 - 211) Driver's heater defroster low speed blower switch
 - 212) Driver's heater defroster medium speed blower switch
 - 213) Defroster blower motor control switch
- 78 Driver's area
- 214) Amplifier
 - 215) Radio head bracket
 - 216) Driver's coat hook on barrier
- 79 Exit door modesty panel
- 80 Exit door bottom rear leaf
- 81 Exit door bottom forward leaf
- 82 Exit door forward leaf shaft bearing & boomerang
- 83 Exit door bottom both leaves
- 84 Exit door forward portions of operating mechanism box
- 217) Alarm bell time delay relay sensitive edge
 - 218) Curb light relay
 - 219) Lock out relay
 - 220) Door control relay
 - 221) Door enable relay

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- 84 Exit door forward portion of operating mechanism box - (Cont'd.)
- 222) Time delay relay
 - 223) Sensitive edge pressure switch alarm & recycle bell
 - 224) Door opening magnetic valve
 - 225) Door operating motor
 - 226) Passenger stop switch
- 85 Exit door rear portion of operating mechanism box
- 227) Door enable relay
 - 228) Door control relay
 - 229) Emergency release valve to enable manual opening of doors
 - 230) Micro switch to enable exit door emergency alarm
- 86 Exit door operating equipment mechanism box
- 87 Exit door full view operating equipment mech box
- 88 Entrance door operating equipment mech box
- 231) Entrance door stepwell mirror
 - 232) Mirror to view exit stepwell mirror
 - 233) Door opening mag valve
 - 234) Operating motors
 - 235) Emergency entrance door opening valve
- 89 Entrance door area
- 236) Passenger stop switch
- 90 Driver's heater and farebox area
- 91 View from turntable area to front of bus
- 92 View from turntable to front including floor & ceiling
- 93 Emergency egress hatch and power vent open
- 94 Short view rear to front completed bus
- 95 Front to rear view floor and seats
- 96 Front to rear including floor and ceiling
- 97 Front to rear from tractor
- 98 Front to rear view seats left side
- 99 Tractor left side HVAC control panel in heat duct

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99A HVAC control panel in heat duct

100 Trailer street side HVAC control panel in heat duct

100A Trailer street side HVAC control panel wired

101 Thermistor location street side heat duct air return grill in place
237) Two speed thermostat
238) Temperature controller heat and cool

101A Thermistor location street side tractor grill off

101B Trailer curbside thermistor in heat duct
239) Temperature controller

102 Right side tractor shock cover drive axle shock cover and access
in heat duct for suspension bellows bolt removal

103 Left side tractor shock cover drive axle shock cover and access
in heat duct for suspension bellows bolt removal

104 Left side trailer with HVAC air outlet in turntable area

105 Right side trailer with HVAC air outlet in turntable area

106 Turntable seat right side

107 Seat pedestals front to rear of bus
240) Water box which houses surge tank, automatic engine oil
level reservoir and power steering reservoir. These
items serviced from outside of bus

108 View to rear from exit stepwell

109 Lounge seat in normal position

110 Lounge seat raised and propped

111 Seating left side of trailer

112 Seating both sides of trailer

PHOTO
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BUS INTERIOR UPFITTING, INSULATION, FLOOR, WIRING, MELAMINE
PANEL INSTALLATION

- 113 Tractor interior sidewalls and ceiling before insulation
- 114 Tractor left side wall before insulation
- 115 Tractor trailer sidewalls & ceiling before insulation
 - 241) Dome light wiring
 - 242) PA System speaker wires
 - 243) Roof power vent wires
- 116 Trailer floor boards installed & sidewalls insulated
- 117 Right side trailer with HVAC fresh air opening
- 118 Tractor left sidewall insulated floor boards installed HVAC fresh air opening in wall and cutouts in floor for HVAC openings
- 119 Trailer left sidewall insulated prior to floor board installation. Brackets visible for installing & securing heater boxes.
- 120 Ceiling and sidewall insulation installed
- 121 Ceiling insulation in trailer roof
- 122 Tractor and trailer insulating complete
- 123 Sidewall insulation retainer panels installed along with waffle spacers to ensure air flow after melamine panel installation
- 124 Sidewall left side tractor with melamine panels partially installed
- 125 Left side trailer with insulation retainer waffle spacers and wall seat track installed
 - 244) Recirculated air inlet
 - 245) HVAC air outlet
- 126 Trailer HVAC openings in floor right side
 - 246) Typical air transfer duct over wheelhousings
 - 247) Access opening to fuel line connections
 - 248) Fuel tank access to EMCO Wheaton valves
- 126A Access opening to fuel tank EMCO Wheaton valves in trailer floor
- 127 Interior paneling completed
- 128 Floor covering installed

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- 129 Floor seat tracks installed and wheelhouse stainless steel edge trim installed
- 130 Melamine paneling completely installed along with floor covering before heat ducts
- 131 Dome light fixtures being installed
- 132 Roof hatches and power vents installed
- 133 Interior ceiling completed

CHASSIS AND SIDEWALL STRUCTURE

- 134 Right side tractor wall framing
- 135 Left side tractor wall framing
- 136 Sidewall aligning table prior to installation
- 137 Section chassis main structure tractor
- 138 Completed main structure tractor of which there are two
- 139 Tractor front axle and suspension bellows assembly that is welded to main structure rails
- 140 Chassis structure rails in welding fixture
- 141 Turntable installation area of main structure rails
- 142 Tractor chassis rear to front
- 143 Drive axle and engine area of main chassis structure
- 144 Tractor chassis upside down to complete welding of outriggers
- 145 Tractor chassis rear engine support area
- 146 Tractor chassis prepared and ready for marriage fixture
- 147 Trailer chassis being welded
- 148 Trailer chassis in welding fixture
- 149 Fixture for welding turntable floor plate support ring that plate slides on during horizontal articulation
- 150 Trailer axle and suspension bellow assembly

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- 151 Trailer chassis welded rear to front
- 152 Roof frame completed except for grinding weld high spots
- 153 Tractor roof frame structure completed
- 154 Trailer roof frame structure completed
- 155 Securing clamps to roof panel prior to stretching for spot welding
- 156 Panels stretched tight on roof frame structure and being spot welded
- 157 Trailer corner panels spot welded in position
- 158 Tractor roof completed spot welding with power vent and hatch holes completed
- 159 Tractor and trailer roof sections completed
- 160 Trailer chassis in marriage fixture
- 161 Tractor front end structure
- 162 Rear of trailer chassis while still in marriage fixture
- 163 Trailer right side frame structure
- 164 Right rear corner of trailer
- 165 Front of trailer chassis that attaches to turntable
- 166 Right side of trailer with stepwell structure
- 167 Left side tractor sidewall structure
- 168 Right side tractor sidewall structure
- 169 Tractor compartments for batteries, voltage regulator and voltage equalizer
- 170 Fuel heater line installed right side
 - 109) Fuel heater line
 - 249) Brake and accelerator interlock switch
 - 250) Tractor HVAC marine pump
- 171 Left front corner before installation
 - 251) Air reservoir mechanical drain valve
 - 252) Air dryer purge tank

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- 172 Tractor left side front to rear
- 173 Trailer right side rear to front
- 174 Trailer right side front with stepwell structure and tapping plate for lower bearing of exit door shaft
- 175 Rear of tractor with ducting for HVAC air flow to elephant ear outlets
- 176 Rear of tractor with trailer shut off coolant valves to trailer with drive axle shock absorbers installed
- 177 Trailer front to rear left side being prepared for side panel installation
- 178 Tractor right side rear to front being prepared for side panel installation
- 179 Interior roof view of trailer rear before insulation
- 180 Interior complete roof view of trailer before insulation
- 181 Trailer interior before sidewall panel installation
- 182 Tractor roof interior
- 183 Trailer framing structure left rear cover and side
- 184 Left rear side frame structure showing wheelwell
- 185 Trailer right side frame structure
- 186 Installing wheelwell housing
- 187 Tractor right side ready for panel installation
- 188 Trailer framing structure being inspected after leaving marriage fixture
- 189 Air system being pressure checked in tractor
- 190 Front of tractor structure before door installation
- 191 Trailer lounge seat panels being installed
- 192 Trailer sidewall panel being stretched with hydraulic stretcher prior to spot welding
- 193 Trailer panel in place at left rear corner

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- 194 Front end tractor with head lamp doors and heater defroster access door installed
- 195 Right head lamp door open showing resistor to reduce voltage from 24 volts to 12 volts to head lamp
- 196 Driver's heater defroster heater area before installation showing windshield washer solvent reservoir
- 253) Remote air quick disconnect chuck
254) Air filter in air compressor discharge line
- 197 Washer solvent reservoir behind right head lamp door
- 198 Left side front of tractor behind head lamp door and brake valve behind driver's heater access door
- 255) Trailer axle brake low air pressure warning switch
256) Front axle brake low air pressure warning switch
257) Drive axle brake low air pressure warning switch
258) Service brake application valve
259) Transmission kickdown switch
260) Accelerator interlock cylinder
- 199 Close-up view of brake application valve, and transmission kickdown switch
- 261) Steering wheel shaft U-joint
- 200 Brake application valve and transmission kickdown switch
- 201 Close-up view low air pressure warning switches
- 255) Trailer brakes
256) Tractor front axle brakes
257) Tractor drive axle brakes
- 202 Side view low air pressure warning switches & brake application valve
- 262) Power steering unit chassis mounted
- 203 Sidewall panel stretcher in position and stretching material
- 204 Tractor right side panel in position for spot welding
- 205 Fitting trailer left rear corner just below window line
- 206 Tractor left side panel spot welded in position
- 207 Auxiliary radiator opening, left side of tractor

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- 208 Blow up view auxiliary radiator opening
- 209 Trailer right rear A/C compressor access door opening
- 263) A/C Engine air inlet to air filter
- 210 Trailer rear tail and stoplight corners installed
- 211 Left side trailer A/C condenser access door
- 212 Metal finishing tractor right side
- 213 Trailer A/C unit assembly compartment
- 214 Entrance door stepwell structure with reinforcement channels,
top & bottom, for stepwell divider assist rail fastening
- 215 Close-up view entrance door stepwell structure
- 216 Entrance door stepwell installed
- 217 Underbody view entrance door stepwell installed
- 218 Exit door stepwell structure with tapping plate for securing
door shaft bearing assembly
- 219 Exit door stepwell installed
- 220 Exit door shaft bearing bracket fastened to tapping plate
- 221 Full view exit door stepwell installed
- 222 Trailer interior rear foaming station
- 223 Trailer chassis front
- 224 Trailer structure marine pump installation area just before
foaming
- 225 Structure at auxiliary radiator installation area
- 226 Drive axle bellows suspension support
- 227 Trailer axle brake quick release valve (264) quick release valve
- 228 Tractor and trailer out of paint shop ready for upfit line.

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VIEW COMPONENTS FROM TOP AS INSTALLED-TRACTOR & TRAILER BEFORE
FLOOR BOARDS

- 229 Tractor toward rear showing various air and refrigerant lines
and muffler location
- 265) Freon pressure line
266) Freon suction line
00) Air compressor ping tank
- 230 Top view tractor chassis rear to front
- 231 Top view bus engine air filter assemblies and turbo charger
- 232 Top view engine air filters, turbo charger, air compressor &
engine assembly
- 233 Air lines and freon lines just behind front wheel housings
- 234 Stepwell structure, farebox area and air reservoirs
- 235 Partial view driver's platform area and M.A.N. engine auxiliary
radiator installation (267) auxiliary radiator assembly
- 236 Full view driver's platform area with seat reinforcement
- 237 Auxiliary radiator from interior
- 238 Farebox reinforcement plate
- 239 Radiator shroud and engine fan
- 268) Radiator clean out access cover
- 240 Tractor view chassis front to rear
- 241 Close-up radiator clean out access cover
- 242 Top view drive axle stabilizer
- 269) Stabilizer
- 243 Close-up view drive axle stabilizer
- 244 Drive axle shock absorber mounting bracket top
- 245 Heater boxes left and right side with engine installation areas
- 246 Top view water box with surge tank and oil reservoir for automatic
engine oil level maintaining
- 270) Water box
271) Automatic oil level reservoir vent cap

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- 247 M.A.N. engine muffler heat deflection shield
- 248 Fuel heater line installed
- 249 M.A.N. engine injection pump
- 250 Air compressor
- 251 Engine accelerator linkage, fast idle cylinder and engine shutdown cylinder
- 272) Fast idle cylinder
- 273) Engine shutdown cylinder
- 252 Trailer turntable plate with underside reinforcements
- TURNTABLE AREA WITH WARNING SWITCHES FREON & COOLANT HOSE ROUTING PLUS AIR SUPPLY DUCTING TO TURNTABLE AREA
- 253 Ramp for warning lights alarm switch when vertical hinge angle is exceeded
- 274) Switch installed on tractor left rear
- 275) Ramp installed on trailer left front
- 254 Turntable area horizontal hinge angle warning and brake interlock switch when horizontal hinge is exceeded
- 276) Brake interlock
- 277) Warning alarm switch
- 255 Heater and A/C line routing through turntable area
- 256 Electrical junction box of rear of tractor with wire terminal connections for trailer wires, heater coolant line shut off valves to trailer and horizontal hinge angle switches
- 257 Heater line sleeves in turntable area
- 258 Turntable area with cover on electrical junction box, heater lines with shut off valves and freon flexible line routing
- 259 View of horizontal hinge angle alarm and brake interlock switch
- 276) Brake interlock switch
- 277) Warning alarm switch
- 278) Activating ramp for switches

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- 261 HVAC Flexible duct tubing to elephant ear outlets in turntable area right side
- 262 HVAC Flexible duct tubing to elephant ear outlets in turntable area left side (280) air supply from trailer heater box
- 263 HVAC Flexible duct tubing to elephant ear air outlets right side (281) Air supply from trailer heater box
- 264 Left side HVAC flexible duct tubing
- 265 Right side view exit door opening before door panel installation and articulation bellows area before bellows installation

UNDERSIDE OF COACH STARTING WITH ENGINE, INCLUDING HEATER BOXES
BRAKES & AIR SYSTEM COMPONENTS

- 266 M.A.N. engine assembly being prepared for installation
- 282) Engine cold start plug
- 283) Turbo charger
- 284) From turbo charger to intercooler core
- 285) To intake manifold from intercooler core, intercooler core is air cooled and installed before engine coolant radiator
- 267 Engine installed right side view
- 268 Bottom right side of engine
- 286) Engine low oil pressure warning switch
- 287) Oil pressure required for engine shutdown
- 269 Air compressor discharge line screen filter
- 288) Filter
- 270 Drive axle brake valves
- 289) Load proportioning brake pressure regulating valve
- 290) Brake quick release relay valves
- 271 Drive axle brake valves and trailer brake control
- 291) Trailer brake control valve
- 272 Partial view differential housing and drive shaft
- 291) Trailer axle brake control valve

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- 273 M.A.N. engine muffler and tailpipe
- 274 Right front tractor heater evaporator box
- 275 Full view right front tractor heater evaporator box
- 276 Tractor right side marine pump location
- 292) Marine pump for tractor coolant circulation
293) Brake and accelerator interlock switch for exit door operation
- 277 Transmission oil heat exchanger
- 293) Transmission oil heat exchanger
294) Drive shaft
- 278 Full view underside engine and transmission including turbo charger intercooler core
- 279 Radiator and intercooler core with protective heavy gauge wire mesh
- 280 Tractor left side heater box with coolant pipe routing away from alternator area for accessibility to alternator change
- 295) Hot engine switch
296) HVAC 105° switch for blower motors
- 281 Underside of engine block
- 297) Engine oil heat exchanger
- 282 Underside of engine rear to front when installed
- 283 Engine stop and fast idle actuating solenoids
- 298) Engine fast idle
298a) Engine stop
- 284 Tractor heater line shut off valve and speedometer drive cable at transmission
- 299) Speedometer drive cable
300) Heater line shut off valve
- 285 Transmission and engine assembly rear to front underside assembly installed
- 301) Rear engine supports
302) Engine starter

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- 286 Horizontal hinge angle brake and accelerator interlock solenoid switch installed on tractor bulkhead
- 303) Interlock switch
- 287 View from bottom of hinge angle solenoid switch
- 288 Air reservoirs under tractor ahead of front axle
- 304) Wet or supply tank
- 305) Drive axle brakes
- 306) Suspension
- 307) Drive axle brakes
- 308) Front axle brakes
- 309) Front axle brakes
- 310) Air dryer
- 311) Air dryer muffler at exhaust port
- 252) Air dryer purge tank installed above air dryer in this location
- 267) M.A.N. engine auxiliary radiator location

AXLES DRIVE, FRONT REAR & SUSPENSIONS

- 289 Front view drive axle installed in suspension frame
- 290 Side view drive axle installed in suspension frame
- 291 Rear view drive axle installed in suspension frame
- 292 Rear view drive axle assembly installed
- 312) Parking and exceeded hinge angle brake
- 313) Drive axle service brake chamber
- 293 Drive axle brake chambers
- 314) Park brake release air liner
- 315) Air lines to service brake chambers
- 294 Front view drive axle brake chambers
- 295 Rear axle and tire assemblies front view with exhaust cross over pipe and transmission heat exchange visible
- 296 Left side drive axle suspension
- 316) Suspension bellows
- 317) Leveling valve
- 318) Shock absorber

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- 297 Right side drive axle suspension
- 298 Trailer axle suspension bellows support
- 299 Tractor left front axle suspension bellows support
- 300 Trailer axle suspension without spindle support
- 319) Trailer axle suspension cushioning air reservoir
- 320) Load sensing shock
- 301 Spindle support assembled prior to installation
- 302 Right side tractor axle leveling valve
- 321) Leveling valve
- 303 Right side trailer axle wheelwell
- 304 Right side trailer top portion of suspension and bellows support
- 305 Another view right side trailer suspension bellows and support
- 306 Drive axle area before axle installation
- 307 Front view of right front axle assembly
- 322) Front axle suspension leveling valve
- 308 Front view of left front axle assembly
- 309 Drive axle right side suspension bellows and leveling valve area
before installation
- 310 Drive axle bellows installed
- 311 Tractor right side drive axle shock absorber and leveling valve
link
- 323) Leveling valve adjustable link
- 312 Tractor left side drive axle shock absorber & leveling valve
adjustable link
- 313 Steering gear and steering drag link
- 324) Steering gear
- 325) Drag link
- 326) Air compressor unloader valve
- 327) Four-way protection valve
- 328) Pressure regulator valve

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- 314 Close-up tractor suspension, drive axle brake and supply reservoir
329) Pressure regulator
330) Pressure protection valve
- 315 Water box interior from underside of bus
331) Power steering reservoir
332) Coolant surge tank
333) Coolant surge tank
334) Automatic engine oil level reservoir
- 316 Tractor front axle load proportioning valve
335) Proportioning valve
- 317 Air dryer purge tank with air reservoirs and air dryer
- 318 Underside view of fuel heater line
- 319 Trailer air reservoirs
336) Trailer axle brake
337) Trailer suspension
338) Accessories
339) Air duct to turntable area right side
340) Fuel tank
341) Air duct to turntable area left side
- 320 Close-up trailer air reservoirs and axle brake proportioning valve
342) Proportioning valve
- 321 Trailer air reservoirs with grease fittings for turntable lubrication
343) Grease zerks
- 322 Trailer A/C freon line routing at heater box
- 323 Close-up steering gear and compressor unloader valve
- 324 Brake interlock switch
344) Solenoid switch
- 325 Side view brake interlock switch, compressor unloader valve and drive axle brake reservoir
- 326 Underside view left front with air reservoirs, power steering, air dryer and muffler, compressor unloader and drag link

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- 327 Side view air dryer and air muffler
- 328 Front to rear view air reservoirs just behind front bumper
- 329 Underbody air reservoirs and drag link
- 330 Air reservoirs and back side view of brake interlock solenoid switch
- 331 Front axle brake proportioning valve and air reservoirs
- 332 Underbody view tractor entrance stepwell
- 333 Close-up view air dryer, muffler, power steering, auxiliary radiator
and compressor unloader valve
- 334 Entrance door, underbody view, stepwell
- 335 Trailer steering linkage levers
- 345) Trailer coolant marine pumps
- 346) Vapor water valve
- 336 Trailer marine pump view and heat duct to turntable area
- 337 A/C Fuel pump installation location
- 347) A/C Engine electric fuel pump
- 338 Fuel tank installation right side of trailer
- 339 Longitudinal view fuel tank installed
- 340 Underside view waterbox and engine compartment light
- 348) Engine compartment light
- 341 Tractor front axle proportioning valve
- 342 Heater fuel line installation
- 343 A/C Engine electric fuel pump and trailer quick release
brake valve
- 344 Tractor marine pump installation from front to rear
- 345 Tractor heat vapor water valve
- 349) Vapor water valve
- 346 Marine pump and interlock valve

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347 Close-up view underbody at waterbox
350) Air transfer duct beneath waterbox
348 Full view air transfer duct under waterbox
351) Air duct moisture drain facility
349 Bus on alignment pit

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7100 SERIES ARTICULATED BUSES

NUMERICAL INDEX OF COMPONENTS

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20	Turn signal indicator relay	
21	Dome lights left side relay	
22	Dome lights right side relay	
23	Radiator auxiliary fan motor relay	
24	Alternator discharge light relay	
25	Roof power vents relay	
26	0105 Bus relay	
27	Radio 12 volt relay	
28	Defroster blower motor relay	

MAIN ELECTRICAL CONTROL PANEL - Cont'd.

19

- 29 Starter voltage regulator circuit breaker
- 30 Gauges circuit breaker
- 31 Door actuator stepwell light circuit breaker
- 32 Stop request sign circuit breaker
- 33 Turn & hazard signal lights circuit breaker
- 34 Defroster motor circuit breaker
- 35 Auxiliary radiator fan motor circuit breaker
- 36 Air dryer heat element circuit breaker
- 37 Roof power vent motors circuit breakers
- 38 Trane heater box circuit breaker
- 39 Front destination sign motor circuit breaker
- 40 Door actuator circuit breaker
- 41 PA System amplifier circuit breaker
- 42 Horn, stop and backup light circuit breaker
- 43 Dome lights right side circuit breaker
- 44 Dome lights left side circuit breaker
- 45 Front destination sign light circuit breaker
- 46 Driver's light circuit breaker
- 47 Tail and license plate light circuit breaker
- 48 Clearances & instrument lights circuit breaker
- 49 Curb lights circuit breaker
- 50 Head lamp circuit breaker
- 51 Door override diodes
- 52 Transmission circuit breaker
- 53 150 Amp bus relay
- 54 Multiple diode assemblies
- 55 PA System amplifier
- 56 Transmission printed circuit control board
- 57 PA System external mike plug
- 58 Brake interlock & radio diodes
- 59 Turn flasher
- 60 Radio 12-volt relay
- 61 Accelerator interlock relay
- 62 Spring brake interlock relay
- 63 Spring brake interlock relay
- 64 Door override II relay
- 65 Door override II relay

ENGINE OIL FILLER PIPE

21

- 66 Engine oil fill pipe
- 67 Engine oil level dipstick

BATTERY COMPARTMENT

24

- 68 Battery circuit disconnect switch

ALTERNATOR PROTECTION SWITCH

25

69 Alternator circuit disconnect switch

VOLTAGE REGULATOR COMPARTMENT

28

70 Compartment light ON/OFF switch
71 A/C Starter circuit breaker
72 Voltage regulator
73 Heater box left front circuit breaker
74 Heater box right front circuit breaker
75 Heater box left rear circuit breaker
76 Heater box right rear circuit breaker
77 Main circuit breaker
78 Booster pump front relay
79 Booster pump rear relay
80 Radio run 12 volt relay
81 HVAC System generator relay
82 Starter interlock relay
83 Engine stop relay
84 Turn signal circuit breaker
85 Engine compartment light circuit breaker
86 Engine cold start circuit breaker
87 Radio 12 volt circuit breaker
88 Farebox 12 volt circuit breaker
89 Booster pump tractor circuit breaker
90 Booster pump trailer circuit breaker
91 HVAC System (CKT 229) circuit breaker
92 Engine cold start relays
93 Engine cold start bi-metal switch
94 Starter interlock module
95 Starter interlock capacitor & diode

BATTERY EQUALIZER COMPONENT

29

96 Battery voltage equalizer
97 Fuel line heater diode
98 Fuel heater relay
99 Fuel line heater circuit breaker
100 Fuel line heater five minute timer relay

A/C CONDENSER GRILL DOOR OPEN

31

101 Ambient sensor switch
101A Starter protection switch

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ENGINE COMPARTMENT DOOR OPEN

39

- 102 Mechanically operated prime fuel pump
- 103 Fuel separator filter
- 104 Engine emergency fuel shutdown solenoid valve
- 105 Engine fuel filters
- 106 Engine air filter assemblies
- 106A Engine air filter minder
- 107 Engine air filter seal to compartment door

ENGINE COMPARTMENT DOOR OPEN

40

- 108 Fuel heater line connections fuel & electrical

FUEL HEATER LINE INSTALLED BEFORE SIDE PANEL

41

- 109 Fuel heater line

SURGE TANK COMPARTMENT DOOR OPEN

42

- 110 Engine automatic oil level reservoir
- 111 Oil reservoir sight glass
- 112 Surge tank filler cap pressure release button in cap
- 113 Surge tank pressure release cap automatic
- 114 Power steering oil reservoir
- 114A Surge tank coolant sight glass

A/C COMPRESSOR ACCESS DOOR OPEN

49

- 115 A/C engine fuel filter
- 116 Suction pressure safety engine shutdown switch
- 117 High pressure safety engine shutdown switch
- 118 Compressor low oil pressure safety engine shutdown switch
- 119 Suction line to accumulator
- 120 Pressure freon line
- 121 A/C Engine supply & fuel return lines

A/C UNIT INSTALLED

50

- 122 A/C Engine high speed switch
- 123 A/C Engine low speed & shutdown switch
- 124 A/C Engine air filter
- 125 A/C Engine air filter minder

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A/C UNIT ASSEMBLY INSTALLATION

53

- 126 Mini generator
- 127 Mini generator protective heat shield
- 128 Coolant temperature gauge sensor bulb
- 129 Low coolant safety engine shutdown switch
- 130 Quick fill crankcase oil fill flex line
- 131 Fan blade belt tension adjusting idler pulley
- 132 Coolant reservoir for A/C engine
- 133 Freon accumulator

A/C ENGINE AND COMPRESSOR

54

- 134 Engine crankcase breather

A/C COMPRESSOR VIEW

56

- 135 Bus backup alarm horn

A/C ENGINE & COMPRESSOR ASSEMBLY

58

- 136 A/C Engine oil heat exchanger
- 137 A/C Engine fuel injection pump
- 138 A/C Engine starter

A/C ELECTRICAL CONTROL PANEL

60

- 139 Automatic start ON/OFF switch
- 140 A/C rear start switch
- 141 Front off rear start switch
- 142 Service lamp switch
- 143 Blower motors solenoid switch
- 144 Starter solenoid switch
- 145 Low water sensor
- 146 Time delay relay
- 147 CR1 relay Hi-Low pressure protection
- 148 CR2 relay oil & low coolant protection
- 149 Electric fuel pump priming switch
- 150 Unit hour meter
- 151 A/C Engine oil pressure gauge
- 152 A/C Engine coolant temperature gauge
- 153 A/C Fail warning light

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A/C CONDENSER COMPARTMENT

64

- 154 A/C Freon receiver & sight glass
- 155 A/C Freon filter dryer
- 156 Freon shut-off valve for filter service

DESTINATION SIGN COMPARTMENT DOOR OPEN RIGHT SIDE

68

- 157 Exit door master switch

DESTINATION SIGN DOOR OPEN LEFT SIDE

69

- 158 Destination roller curtain motor
- 159 Communication speaker

FIRE EXTINGUISHER LOCATION

71

- 160 Fire extinguisher bracket
- 161 Exit door sensitive edge alarm bell
- 162 Head lamp dimmer switch

v

SIDE CONSOLE SWITCHES

74

- 163 Emergency engine shutdown switch
- 164 Fuel heater line five minute switch
- 165 Roof power vent switch
- 166 Driver's overhead light switch
- 167 Interior dome light switch
- 168 Passenger signal ON/OFF switch
- 169 Engine fast idle switch
- 170 Exit door touch bar override switch
- 171 Exit door panel selector switch
- 172 Entrance door panel selector switch
- 173 Fuel heater line five minute override switch
- 174 Fuel heater line on indicator light

FORWARD PORTION OF SIDE CONSOLE

75

- 175 Park brake ON/OFF valve
- 176 Adjustable HVAC air flow ball
- 177 Door operating control handle valve
- 178 Entrance door dump valve

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DRIVER'S INSTRUMENT PANEL LEFT SIDE

76

- 179 Tractor front & drive axle brake air reservoir pressure
- 180 Trailer axle brake air reservoir pressure
- 181 Instrument panel light test switch
- 182 Hazard light switch
- 183 Turn indicator light switch
- 184 Low coolant warning light
- 185 Engine temperature warning light
- 186 Engine low oil pressure warning light
- 187 Turn indicator left turn indicator light
- 188 Speedometer
- 189 Alternator discharge warning light
- 190 Hi-beam head lamp indicator light
- 191 Stoplight indicator light
- 192 Low air pressure warning light
- 193 Park brake on warning light
- 194 Hinge angle exceeded warning light
- 195 Right turn indicator light
- 196 Transmission temperature overheat warning light
- 197 Starter switch
- 198 A/C Fan warning light
- 199 Rear door unlock indicator light
- 200 Reostat instrument panel lights for dimming
- 201 Master run switch
- 202 Cold start switch & indicator light

DRIVER'S INSTRUMENT PANEL RIGHT SIDE

77

- 203 Left wiper control valve
- 204 Right wiper control valve
- 205 Transmission selector switch
- 206 Transmission lockout switch
- 207 Retarder off indicator light
- 208 Retarder ON/OFF switch
- 209 Engine auxiliary radiator fan motor switch
- 210 Driver's heater defroster ON/OFF switch
- 211 Driver's heater defroster low speed switch
- 212 Driver's heater defroster medium speed switch
- 213 Defroster blower motor control switch

DRIVER'S AREA

78

- 214 Amplifier
- 215 Radio head bracket
- 216 Driver's coat hook

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FORWARD PORTION MECH BOX EXIT DOOR

84

- 217 Alarm bell time delay relay sensitive edge
- 218 Curb light relay
- 219 Lockout relay
- 220 Door control relay
- 221 Door enable relay
- 222 Time delay relay
- 223 Sensitive edge pressure switch for door recycle
- 224 Door opening mag valve
- 225 Door operating motor
- 226 Passenger stop switch

REAR PORTION MECH BOX EXIT DOOR

85

- 227 Door enable relay
- 228 Door control relay
- 229 Emergency release valve for manual opening of doors
- 230 Micro switch to enable exit door emergency alarm

ENTRANCE DOOR OPERATING EQUIPMENT MECH BOX

88

- 231 Entrance door stepwell mirror
- 232 Mirror to view exit door stepwell mirror
- 233 Door opening mag valve
- 234 Operating motors
- 235 Emergency entrance door opening valve

ENTRANCE DOOR AREA

89

- 236 Passenger stop switch

THERMISTOR LOCATION STREETSIDE HEAT DUCT AIR RETURN

101

- 237 Two speed thermostal
- 238 Temperature controller heat & cool

TRAILER CURBSIDE THERMISTOR IN HEAT DUCT

- 239 Temperature controller 101B

SEAT PEDESTALS FRONT TO REAR OF BUS

107

- 240 Water box access from outside

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TRACTOR TRAILER SIDEWALLS & ROOF

115

- 241 Dome light wiring
- 242 PA System speaker wire
- 243 Roof power vent wire

LEFT SIDE TRAILER AFTER INSULATION

125

- 244 Recirculated air inlet opening in floor
- 245 HVAC air outlet in floor

TRAILER HVAC OPENINGS IN FLOOR RIGHT SIDE

126

- 246 Typical air transfer duct over wheelhousings
- 247 Access opening to fuel line connections
- 248 Access opening to Emco Wheaton valves on fuel tank

FUEL HEATER LINE INSTALLED RIGHT SIDE

170

- 249 Brake & accelerator interlock switch
- 250 Tractor booster pump
- 109 Fuel heater line

LEFT FRONT CORNER TRACTOR BOTTOM

171

- 251 Air reservoir mechanical drain valve
- 252 Air dryer purge tank

HEATER DEFROSTER AREA BEFORE INSTALLATION OF SAME

196

- 253 Remote air quick disconnect chuck
- 254 Air filter compression discharge line

TRACTOR LEFT FRONT

198

- 255 Trailer axle brake low air pressure warning switch
- 256 Front axle brake low air pressure warning switch
- 257 Drive axle brake low air pressure warning switch
- 258 Service brake application valve
- 259 Transmission kickdown switch
- 260 Accelerator interlock cylinder

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261	Steering wheel shaft U-joint	
	<u>POWER STEERING CHASSIS MOUNTED GEAR</u>	202
262	Power steering unit	
	<u>TRAILER RIGHT REAR EXTERIOR</u>	209
263	A/C Engine air filter inlet	
	<u>TRAILER AXLE QUICK RELEASE VALVE LOCATION</u>	227
264	Quick release valve	
	<u>TOP VIEW TRACTOR CHASSIS</u>	229
265	Freon pressure line	
266	Freon suction line	
00	Air compressor ping tank	
	<u>DRIVER'S PLATFORM AREA PARTIAL VIEW</u>	235
267	Auxiliary radiator assembly	
	<u>RADIATOR SHOUD & ENGINE COOLANT FAN</u>	239
268	Radiator clean out access cover	
	<u>TOP VIEW DRIVE AXLE STABILIZER</u>	242
269	Stabilizer	
	<u>TOP VIEW WATERBOX BEFORE COVER</u>	246
270	Waterbox	
271	Automatic oil level reservoir vent cap	

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TOP VIEW OF M.A.N. ENGINE

251

- 272 Fast idle cylinder
- 273 Engine shutdown cylinder

VERTICAL ARTICULATION ANGLE WARNING SWITCH & RAMP

253

- 274 Switch installed on tractor chassis
- 275 Actuating ramp installed on trailer

HORIZONTAL ARTICULATION ANGLE WARNING SWITCHES

254

- 276 Brake interlock actuating switch
- 277 Warning alarm switch

HORIZONTAL ARTICULATION ANGLE WARNING SWITCH
ACTUATING RAMP

259

- 278 Activating ramp for switches

TURNTABLE AREA TOP VIEW

260

- 279 Supply & return shut off valves to trailer

HVAC FLEXIBLE DUCT TO TURNTABLE AREA LEFT SIDE

262

- 280 Air supply from trailer heaterbox

HVAC FLEXIBLE DUCT TO TURNTABLE AREA RIGHT SIDE

263

- 281 Air supply from trailer heaterbox

M.A.N. ENGINE BEFORE INSTALLATION

266

- 282 Engine cold start plug
- 283 Turbo charger
- 284 From turbo charger outlet to intercooler
- 285 From intercooler to intake manifold

BOTTOM RIGHT SIDE OF ENGINE

268

- 286 Engine low oil pressure warning switch
- 287 Oil pressure switch required for engine shutdown

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AIR FILTER IN COMPRESSOR DISCHARGE LINE

288 Air Filter 269

DRIVE AXLE BRAKE VALVES

289 Load proportioning brake valve 270
290 Brake quick release relay valves

TRAILER BRAKE CONTROL VALVE

291 Brake control valve 271

TRACTOR RIGHT SIDE CHASSIS ENGINE COMPARTMENT

292 HVAC Booster pump for tractor heat 276

TRANSMISSION OIL HEAT EXCHANGER

293 Transmission oil heat exchanger 277
294 Drive shaft

TRACTOR LEFT SIDE HEATERBOX

295 Hot engine switch 280
296 HVAC 105° Switch

UNDERSIDE OF ENGINE BLOCK

297 Engine oil heat exchanger 281

ENGINE FAST IDLE & SHUTDOWN

298 Engine fast idle 283
298A Engine shutdown cylinder

TRACTOR HEATER SHUT OFF VALVE

299 Speedometer drive cable 284
300 Heater line shut off valve

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302	Engine starter	
	<u>HINGE ANGLE INTERLOCK SOLENOID VALVE</u>	286
303	Interlock brake switch horizontal articulation	
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304	Wet or supply tank	
305	Drive axle brakes	
306	Suspension	
307	Drive axle brakes	
308	Front axle brakes	
309	Front axle brakes	
310	Air dryer	
311	Air dryer exhaust port muffler	
	<u>DRIVE AXLE ASSEMBLY INSTALLED</u>	292
312	Parking & hinge interlock brake chamber	
313	Drive axle service brake chamber	
	<u>DRIVE AXLE BRAKE CHAMBERS</u>	293
314	Park brakes release air line	
315	Air lines to service brake chambers	
	<u>LEFT SIDE DRIVE AXLE SUSPENSION</u>	296
316	Suspension bellows or air spring	
317	Leveling valve	
318	Shock absorber	
	<u>TRAILER AXLE UPPER & LOWER CONTROL ARMS</u>	300
319	Axle suspension with added reservoir	
320	Shock absorber load sensing	
	<u>TRAILER AXLE RIGHT SIDE</u>	302
321	Leveling valve with link attached to lower control arm	

ITEM
NUMBER

PHOTO
NUMBER

FRONT VIEW RIGHT SIDE FRONT SUSPENSION

322 Suspension leveling valve 307

TRACTOR RIGHT SIDE DRIVE AXLE

323 Leveling valve adjustable link 311

STEERING GEAR

313

324 Steering gear
325 Drag link
326 Air compressor unloader valve
327 Four-way protection valve
328 Pressure regulator valve

TRACTOR DRIVE AXLE SUSPENSION

314

329 Pressure regulator
330 Pressure protection valve

UNDERSIDE OF WATERBOX

315

331 Power steering reservoir
332 Low coolant indicator switch
333 Surge tank
334 Engine automatic oil level reservoir

TRACTOR FRONT AXLE BRAKE VALVE

316

335 Load proportioning brake valve

TRAILER AIR RESERVOIRS

319

336 Trailer axle brake
337 Trailer suspension
338 Accessories
339 Air duct right side turntable area
340 Fuel tank
341 Air duct left side turntable area

TRAILER AIR RESERVOIRS WITH TRAILER BRAKE VALVE

320

342 Load proportioning valve

ITEM
NUMBER

PHONE
NUMBER

TURNTABLE GREASE-ZERK LOCATION

321

343 Grease zerks

BRAKE INTERLOCK SWITCH

344 Solenoid interlock switch

324

TRAILER STEERING LINKAGE

345 Trailer heat booster pump & motor
346 Vapor water valve

A/C FUEL PUMP INSTALLATION AREA

337

347 A/C Engine electric fuel pump

WATERBOX VIEW & ENGINE COMPARTMENT LIGHT

340

348 Engine Compartment light

TRACTOR HEAT CONTROL VALVE

345

349 Vapor water valve

AIR TRANSFER DUCT AT WATERBOX

347

350 Duct beneath waterbox

AIR TRANSFER DUCT WITH MOISTURE DRAIN

348

351 Air duct moisture drain facility

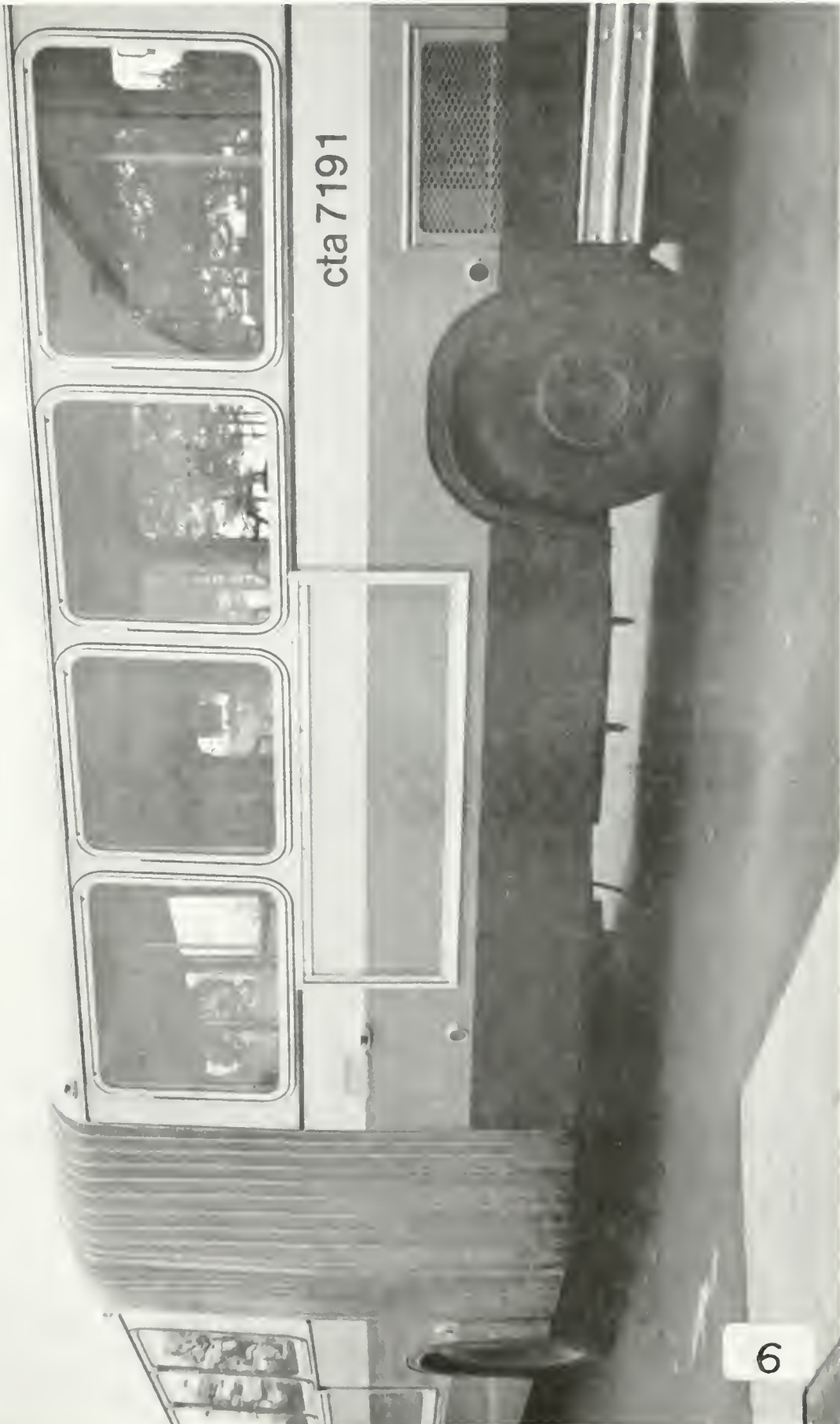


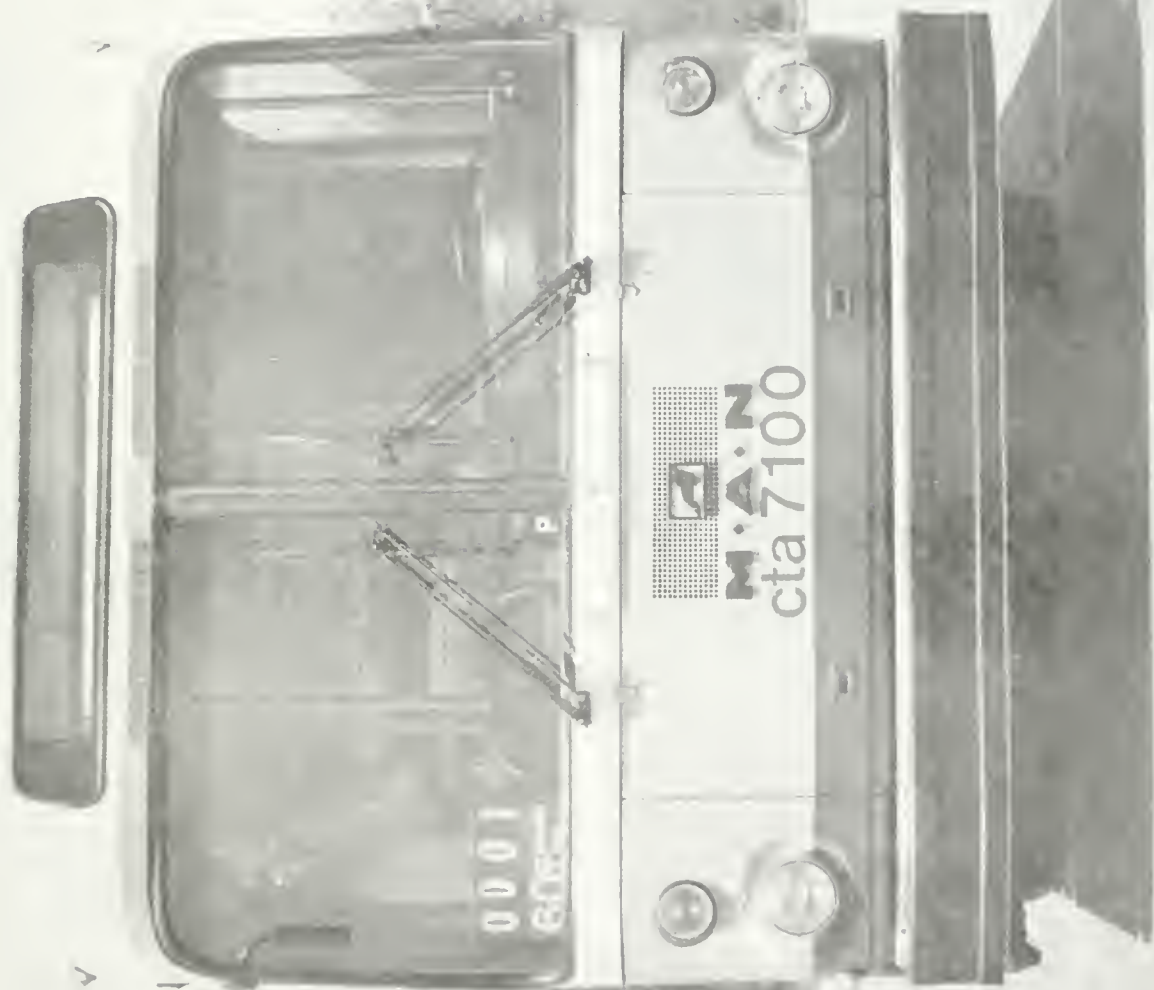


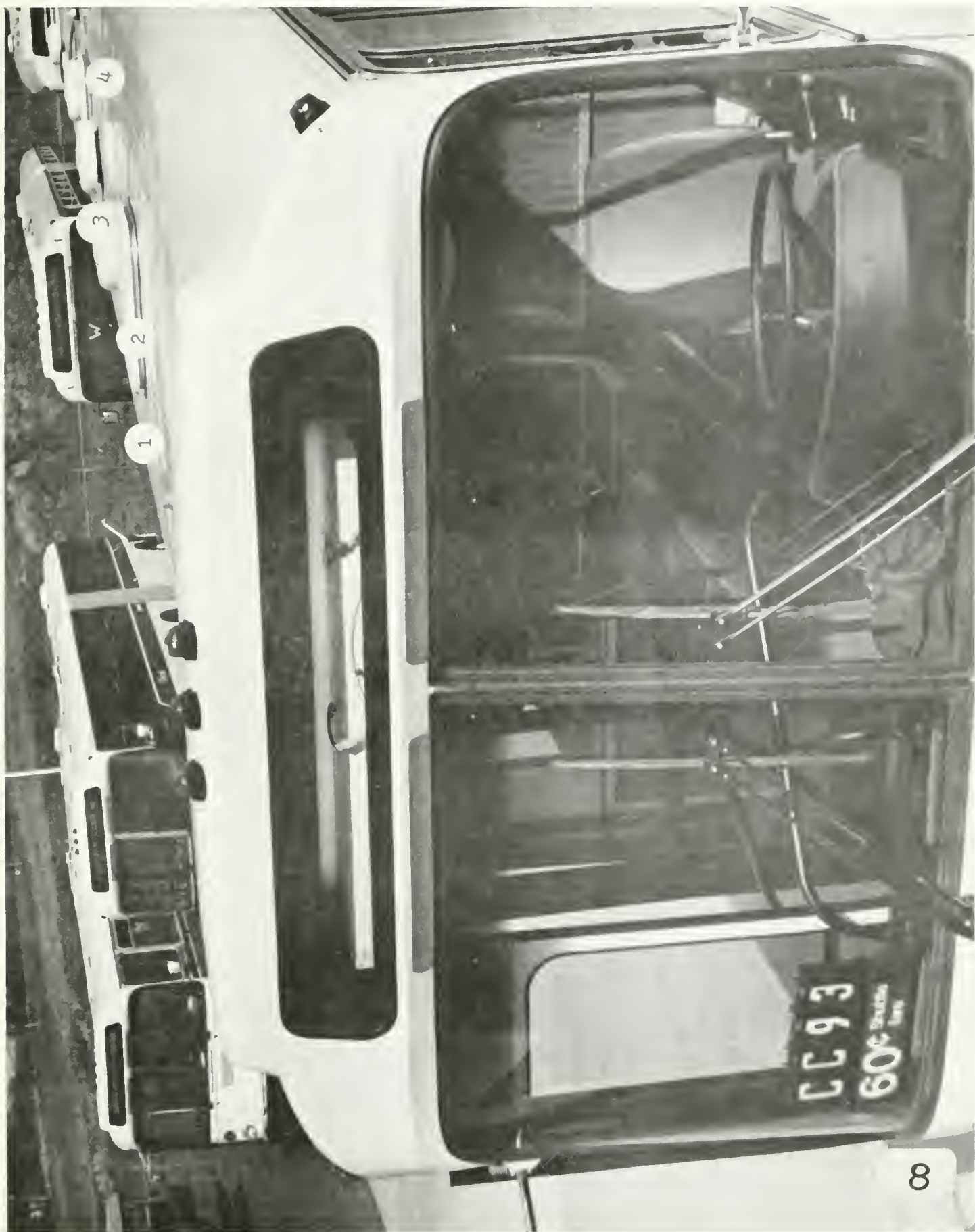




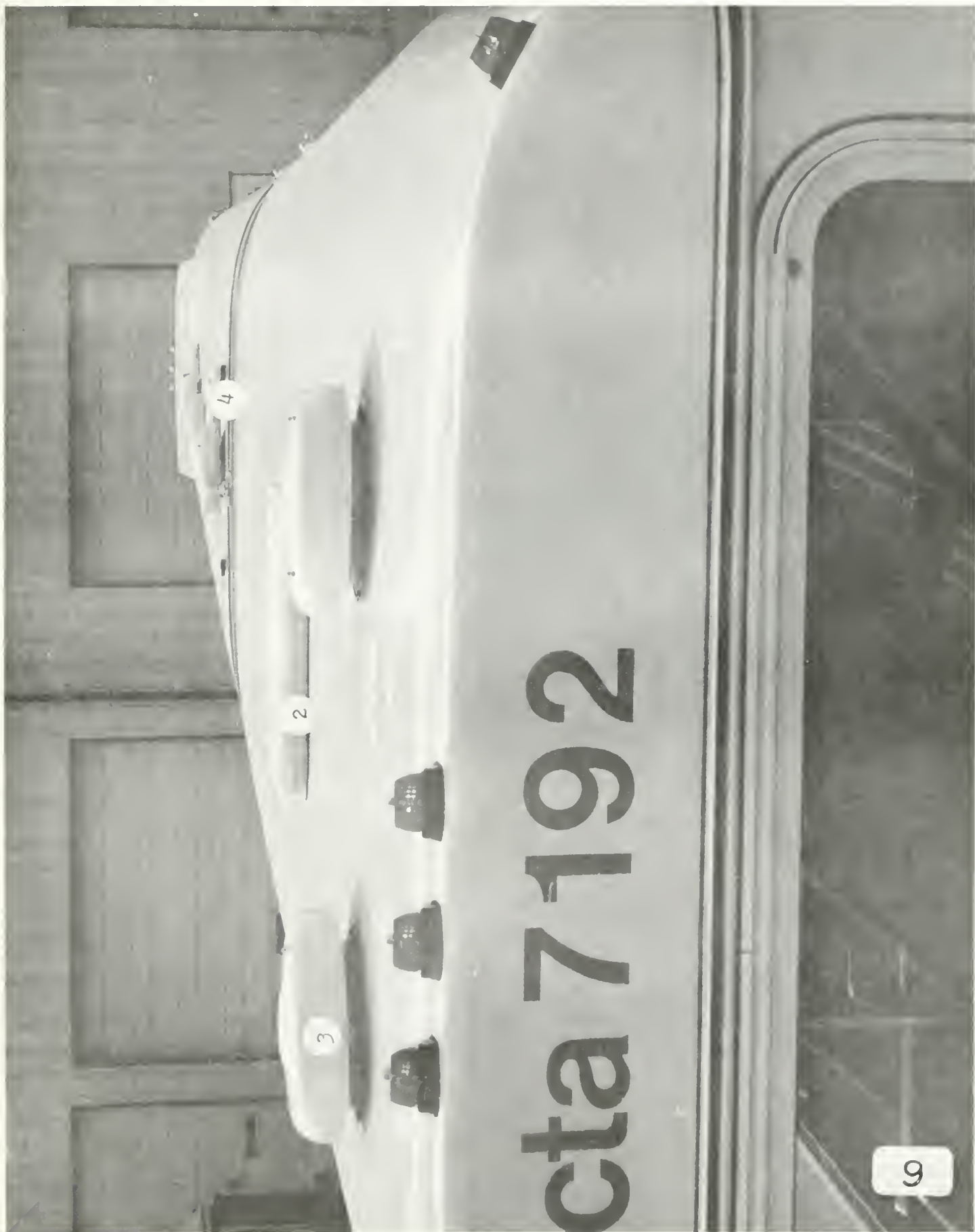




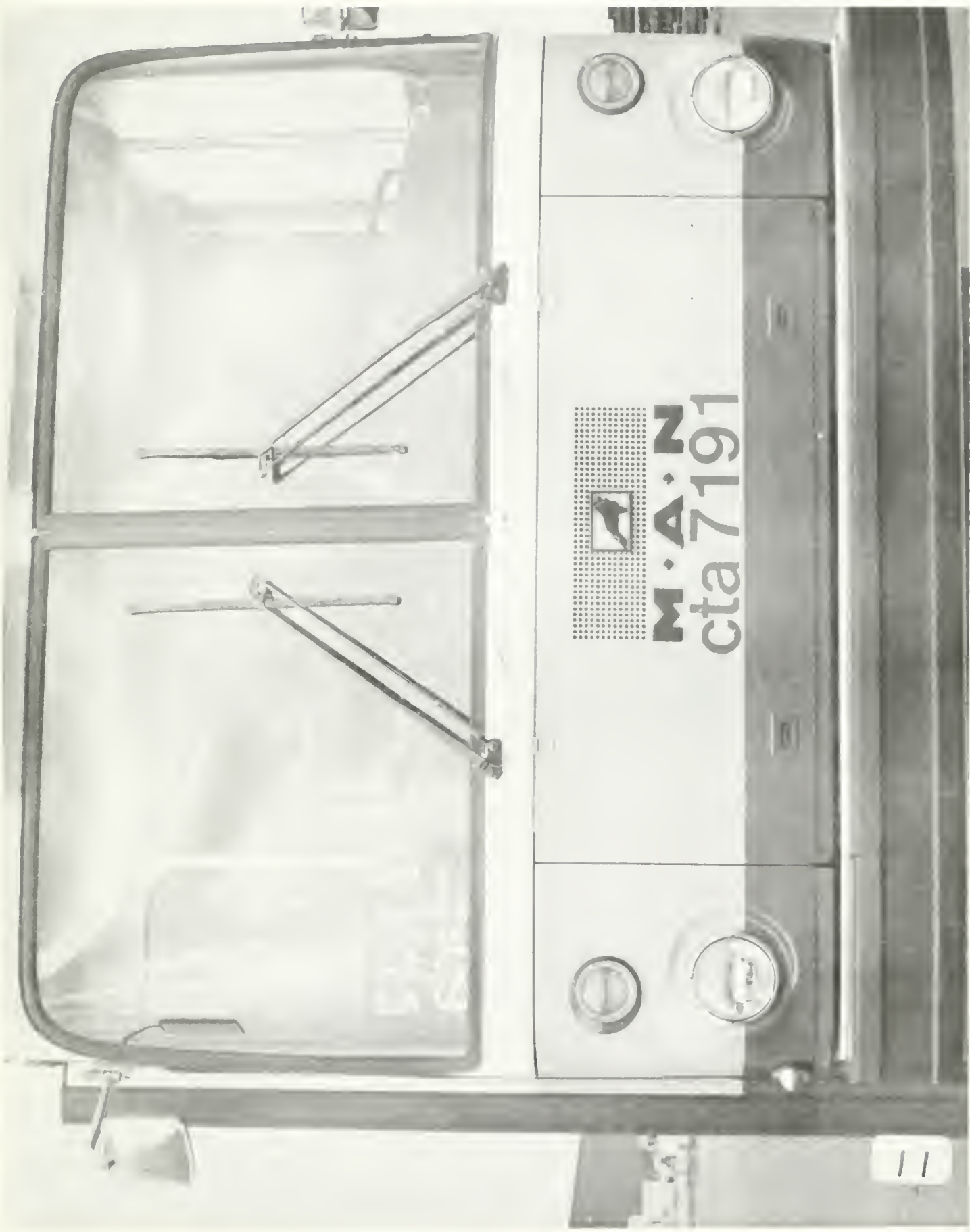




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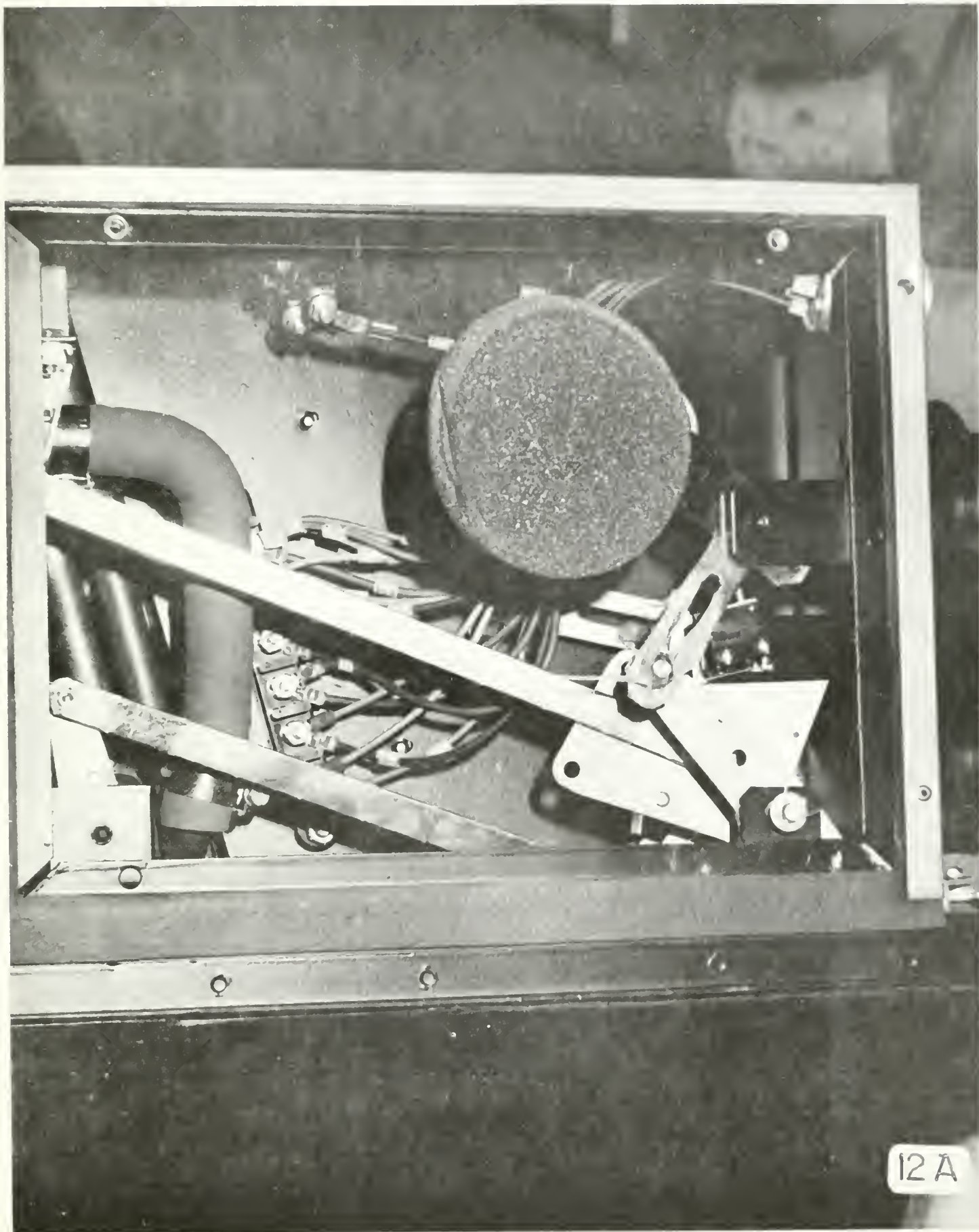


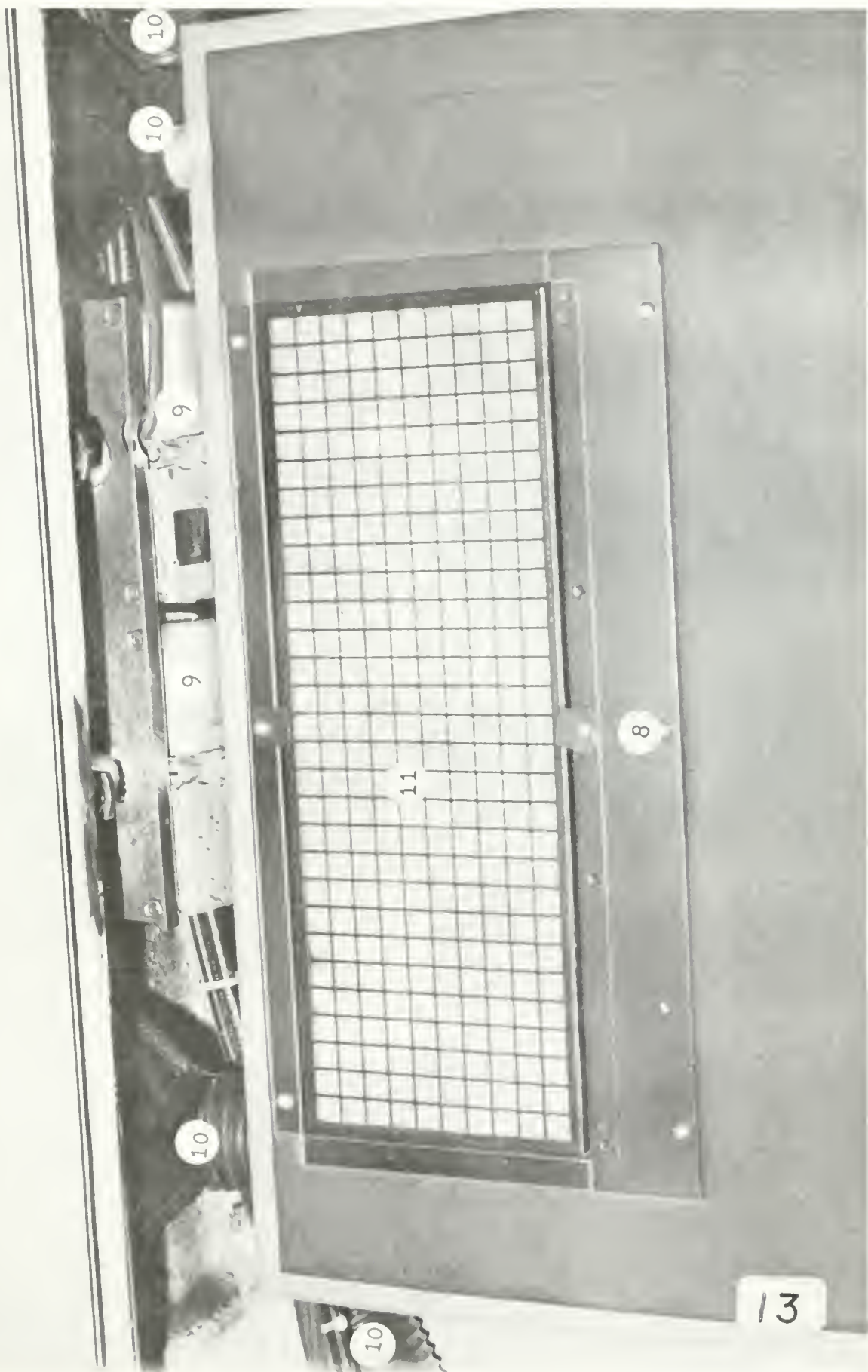
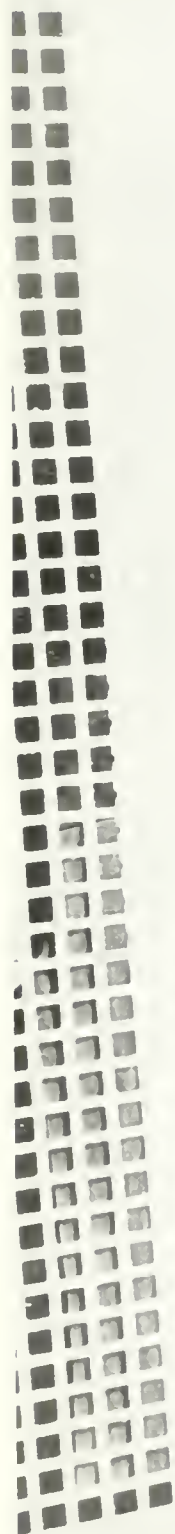




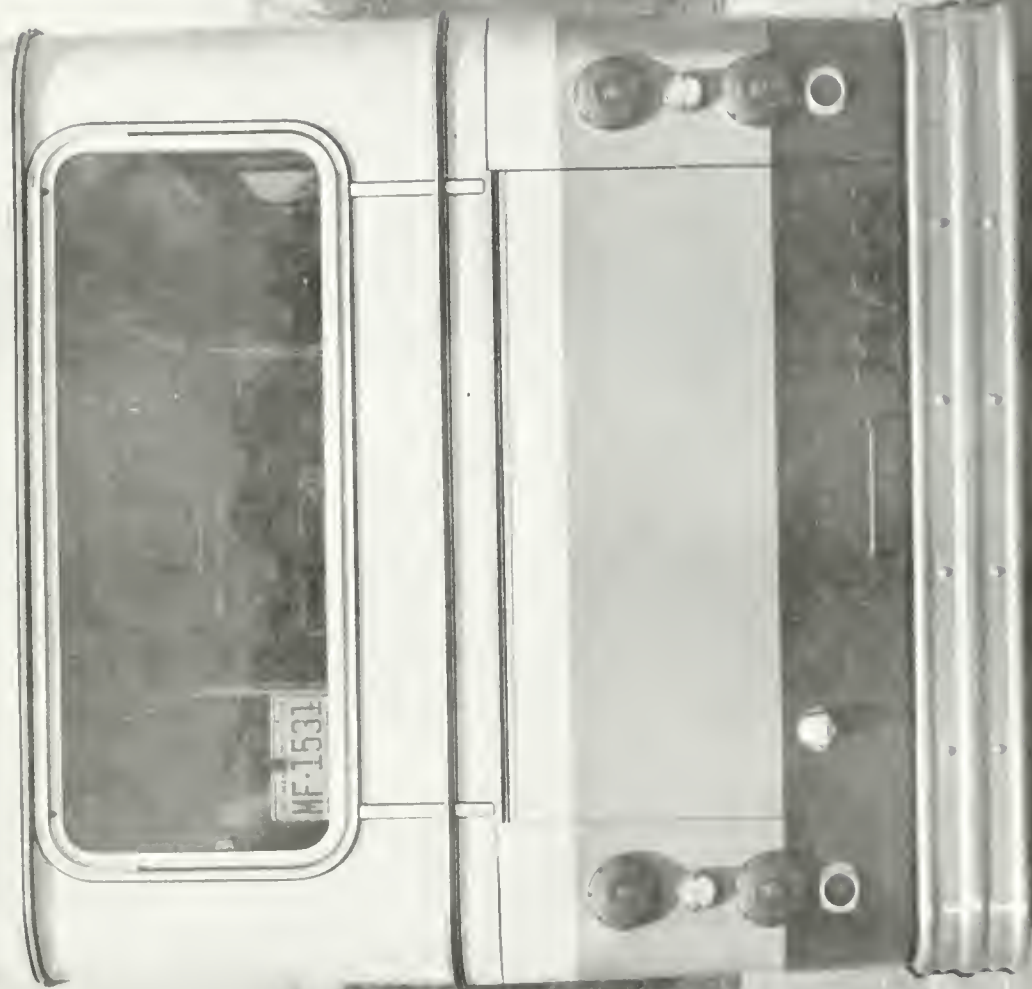
M·A·N
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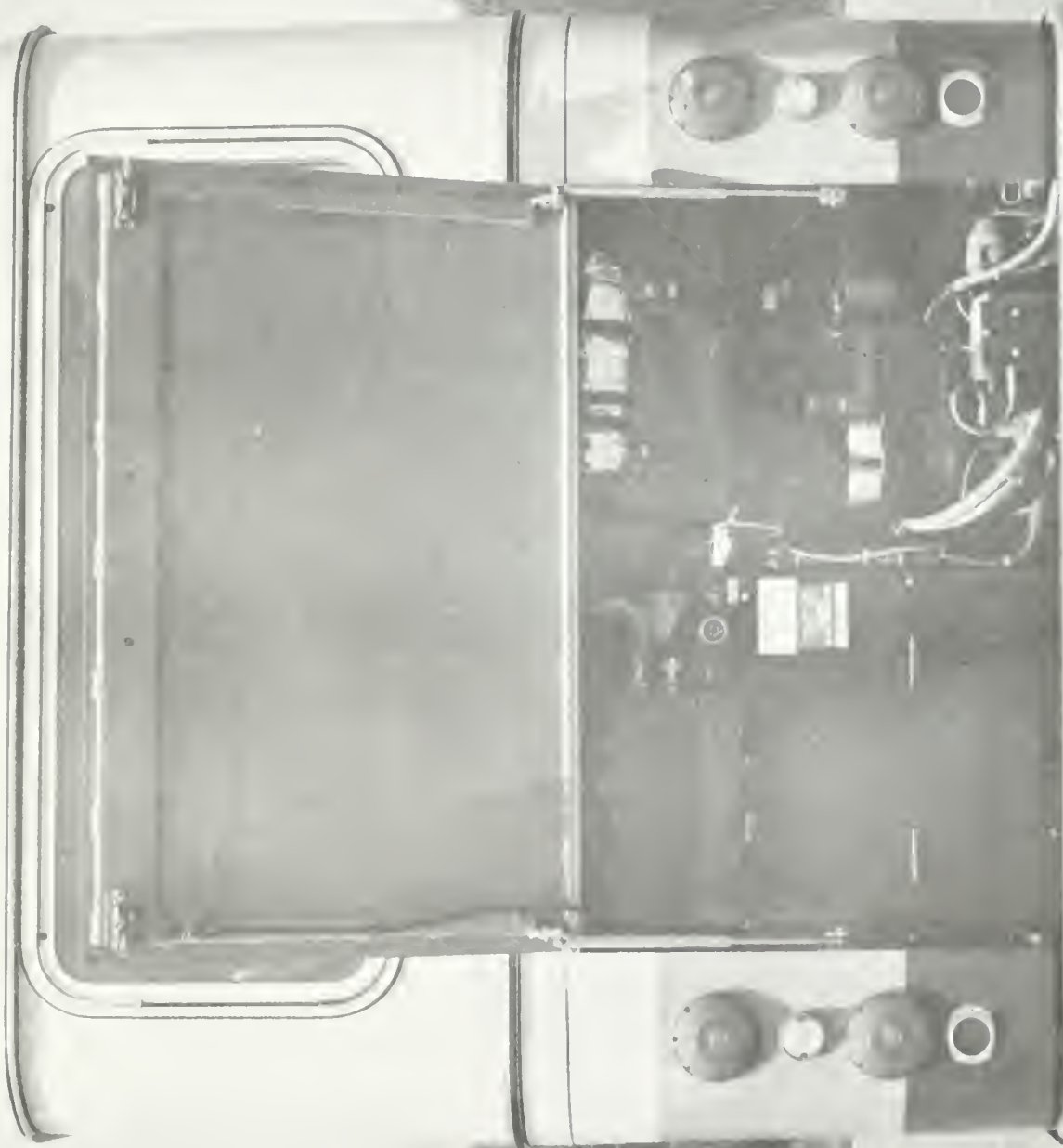


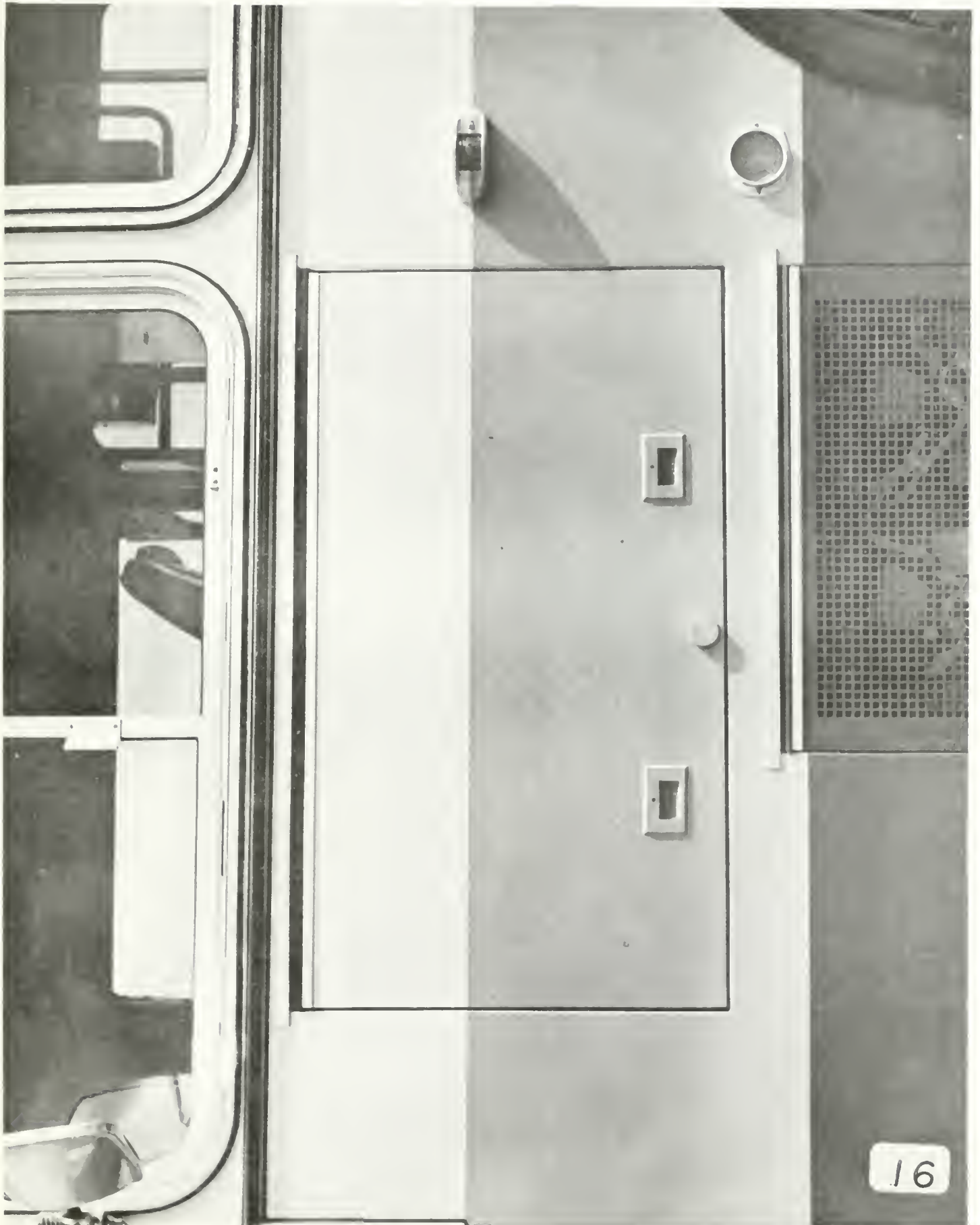


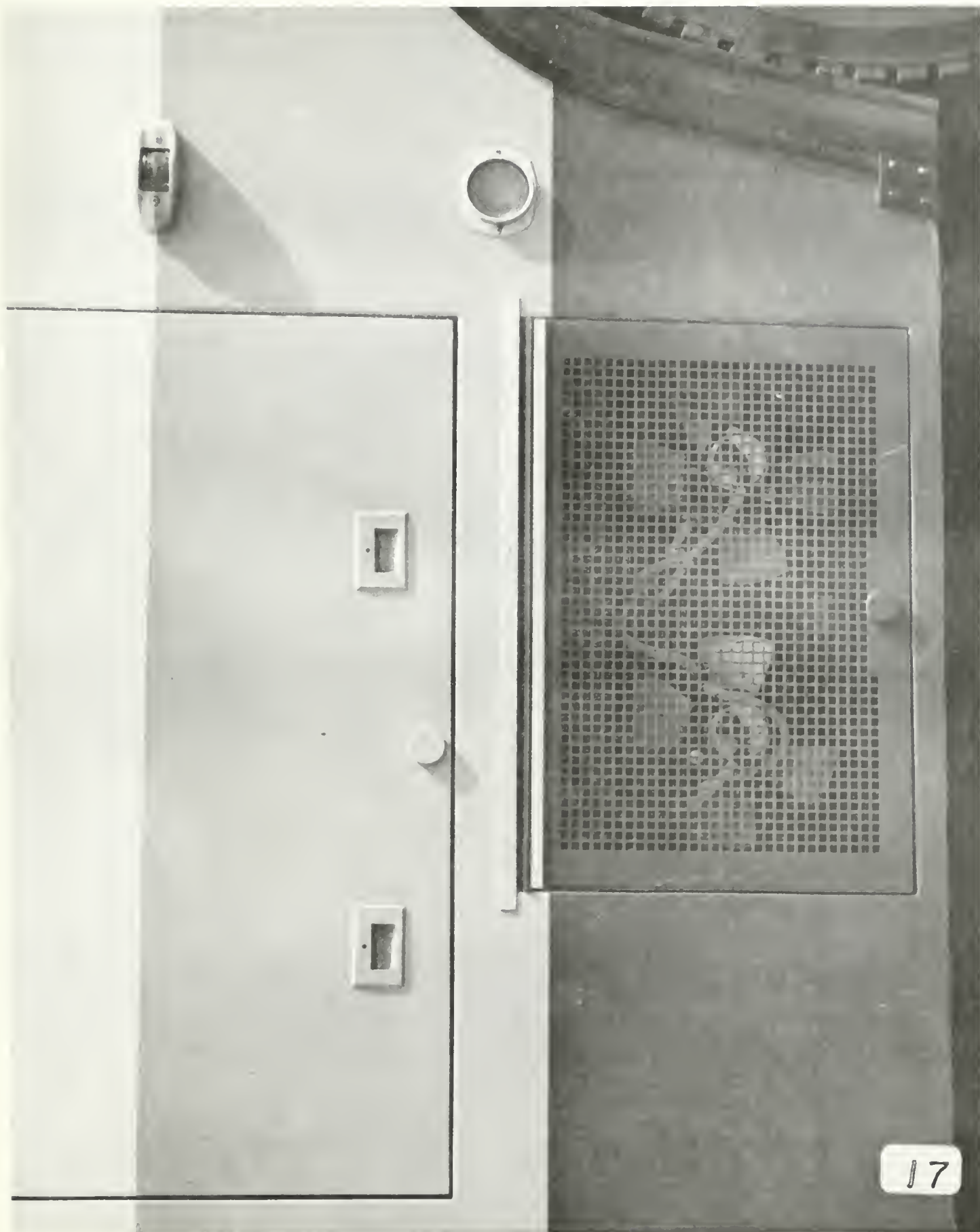
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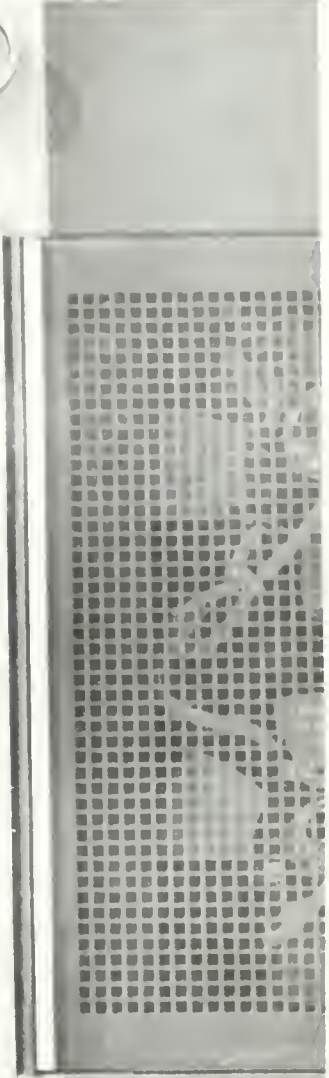
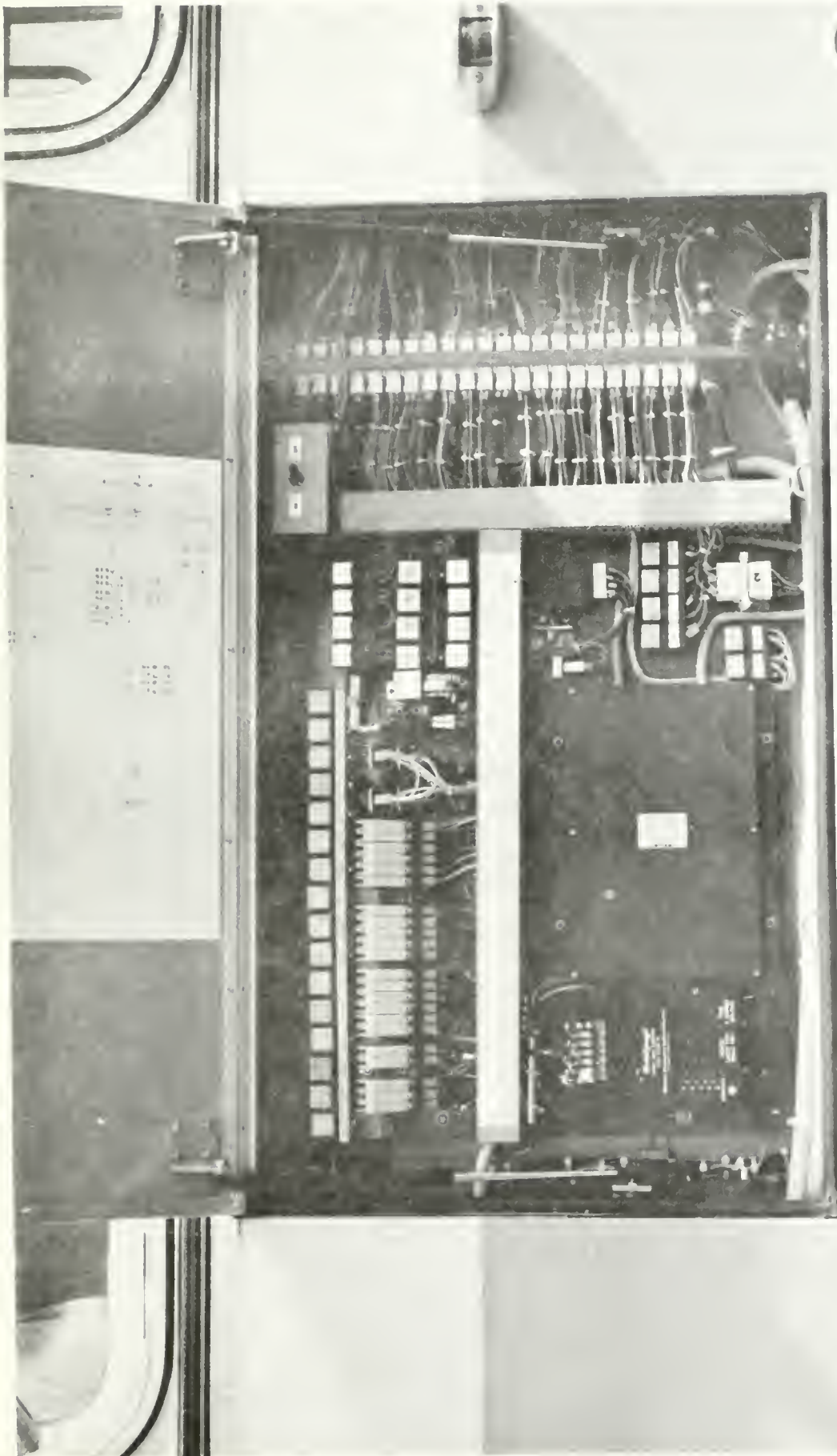


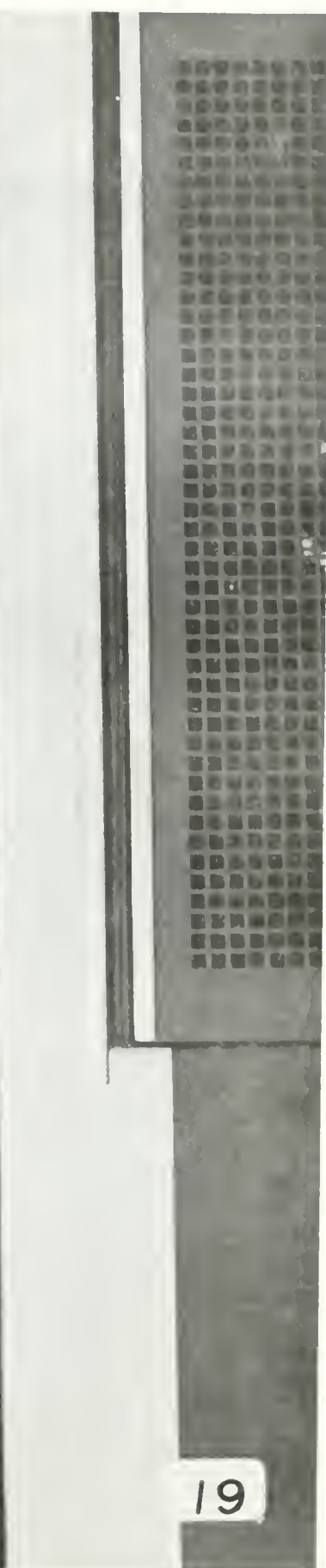
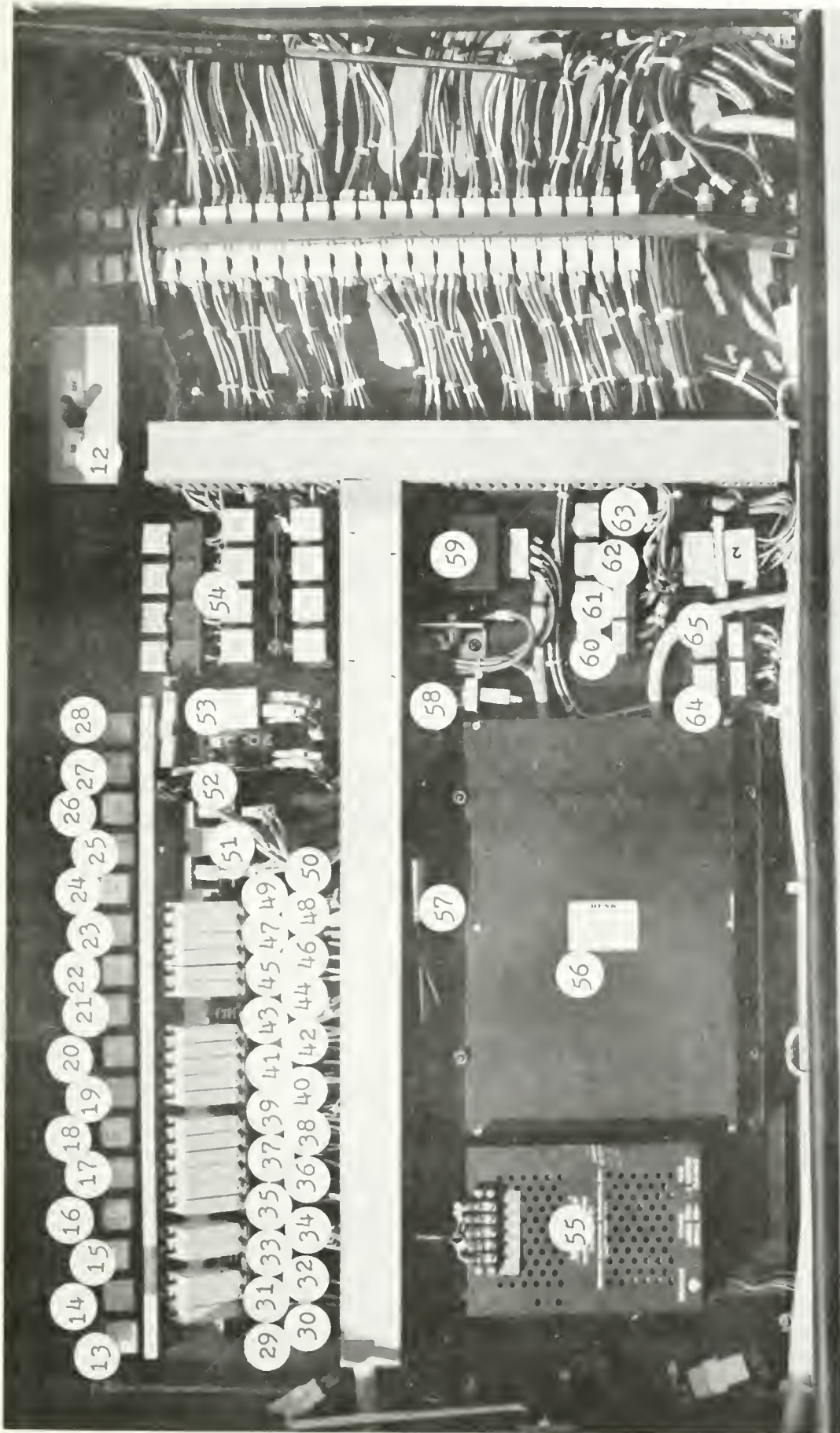
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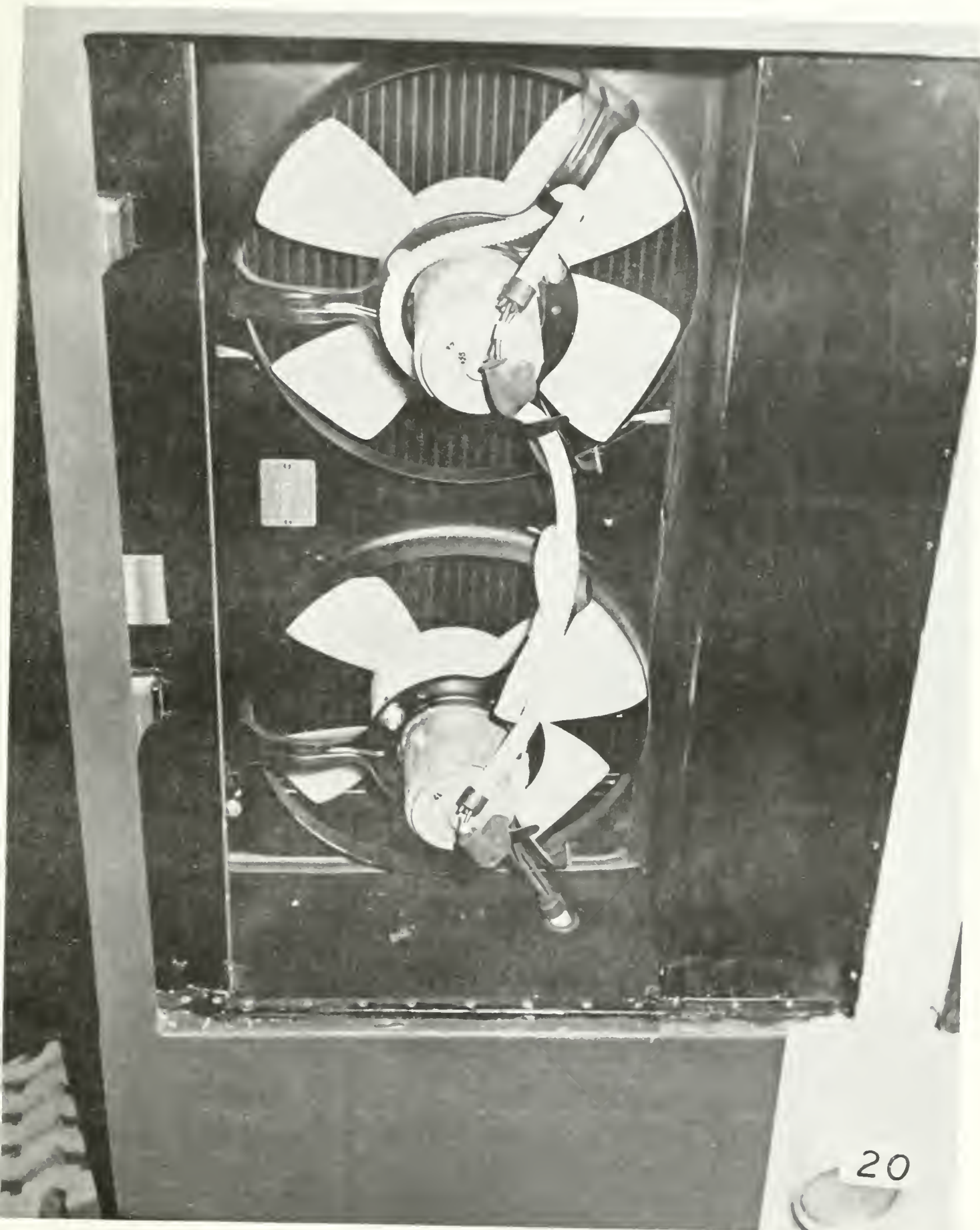








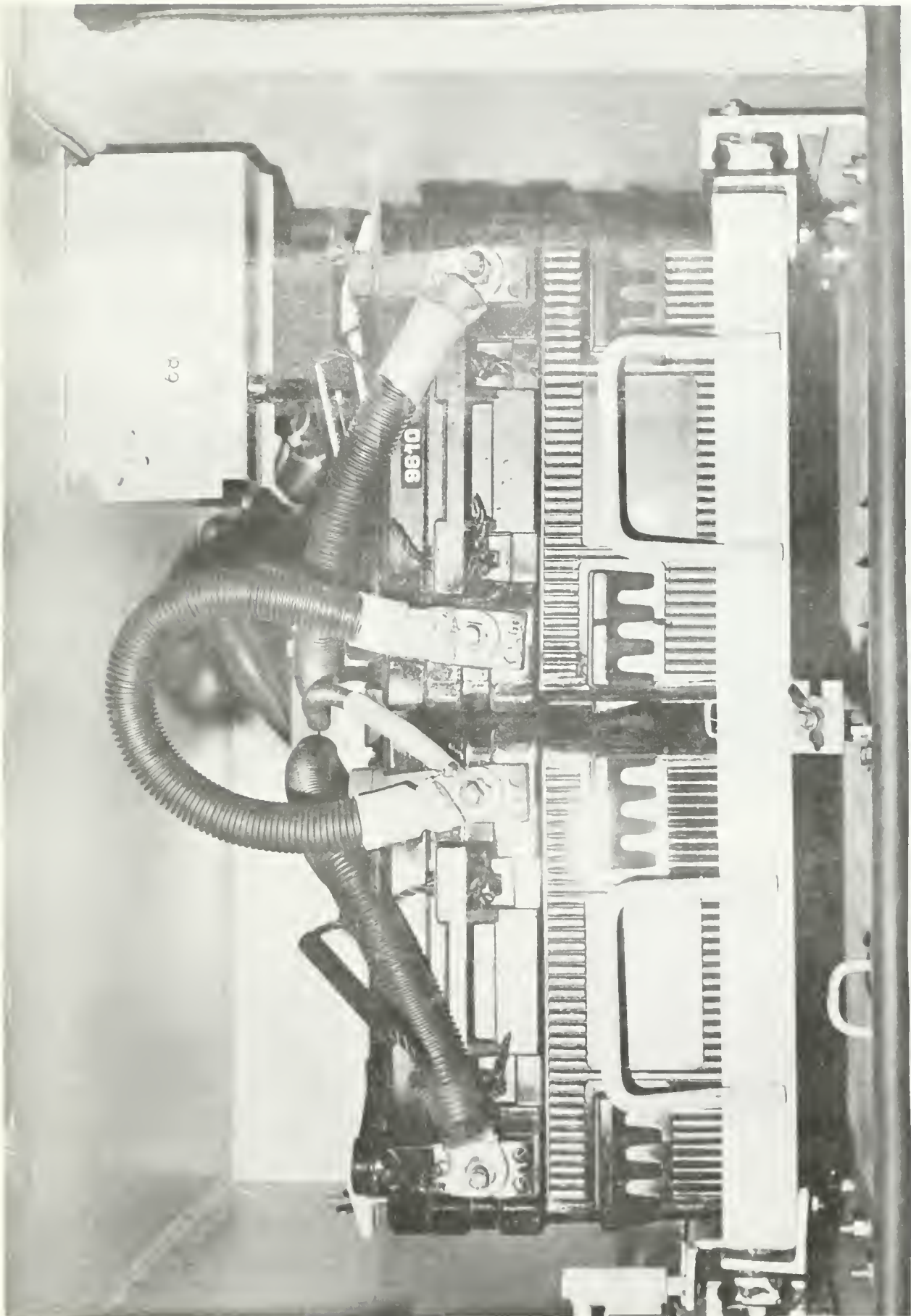




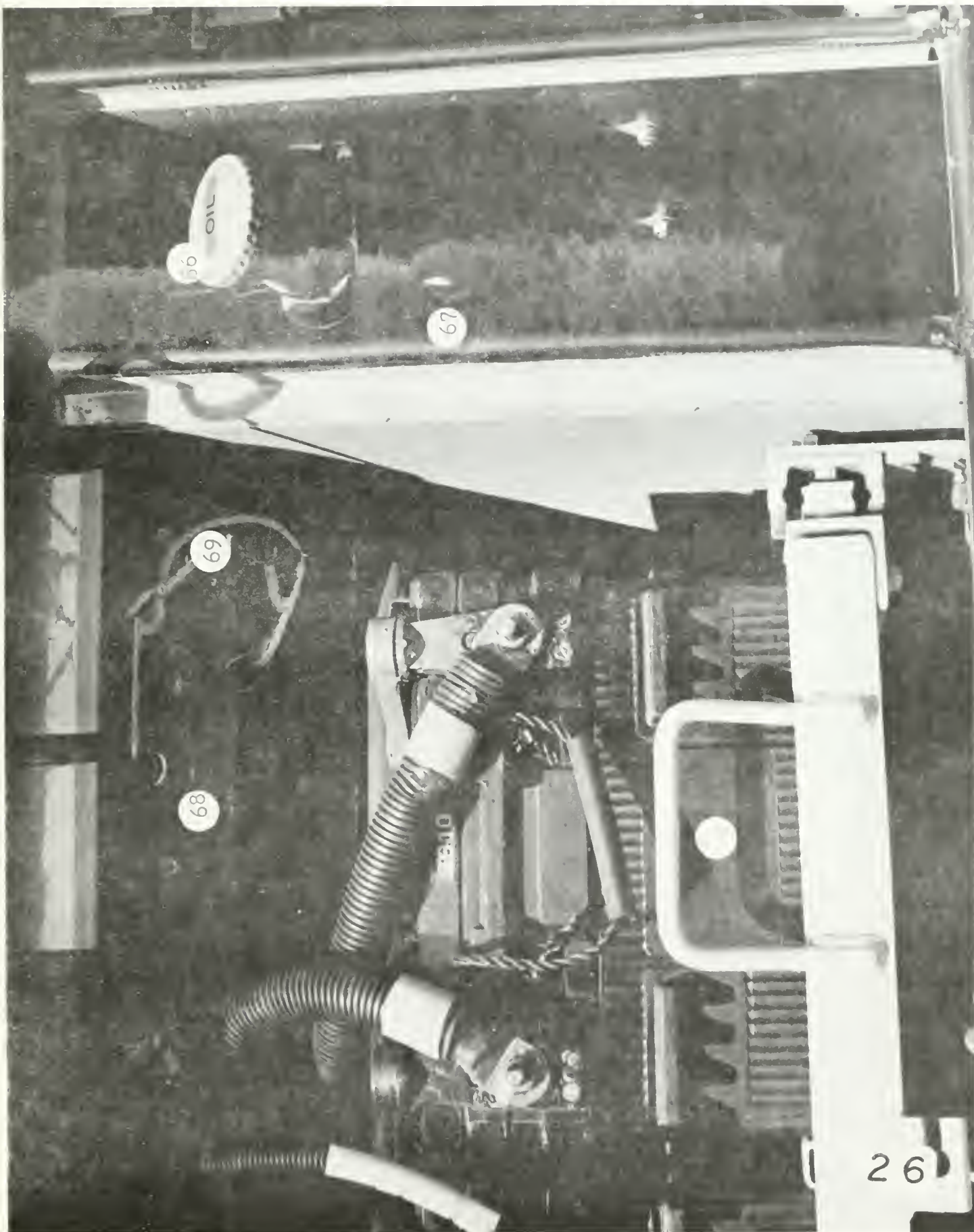










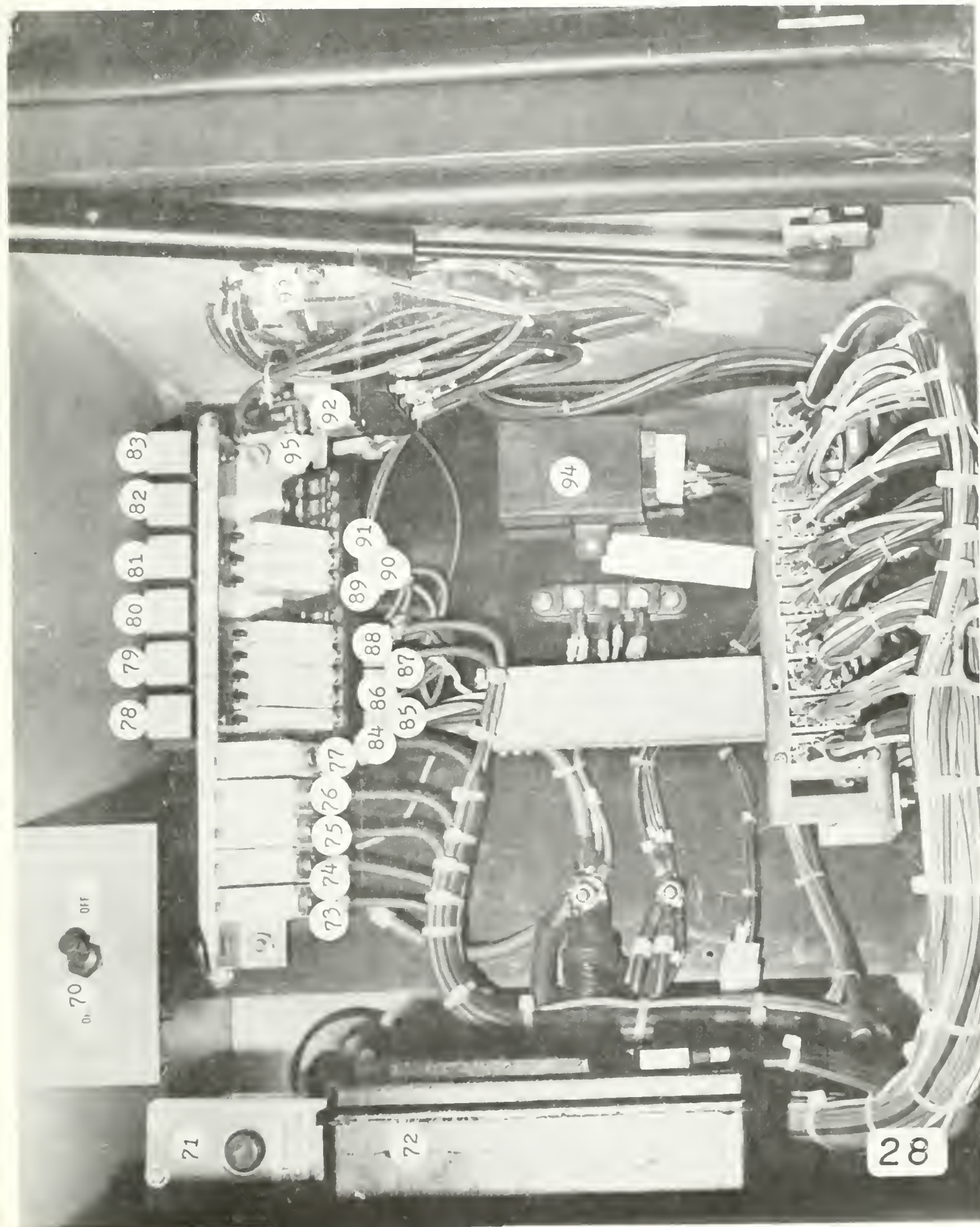


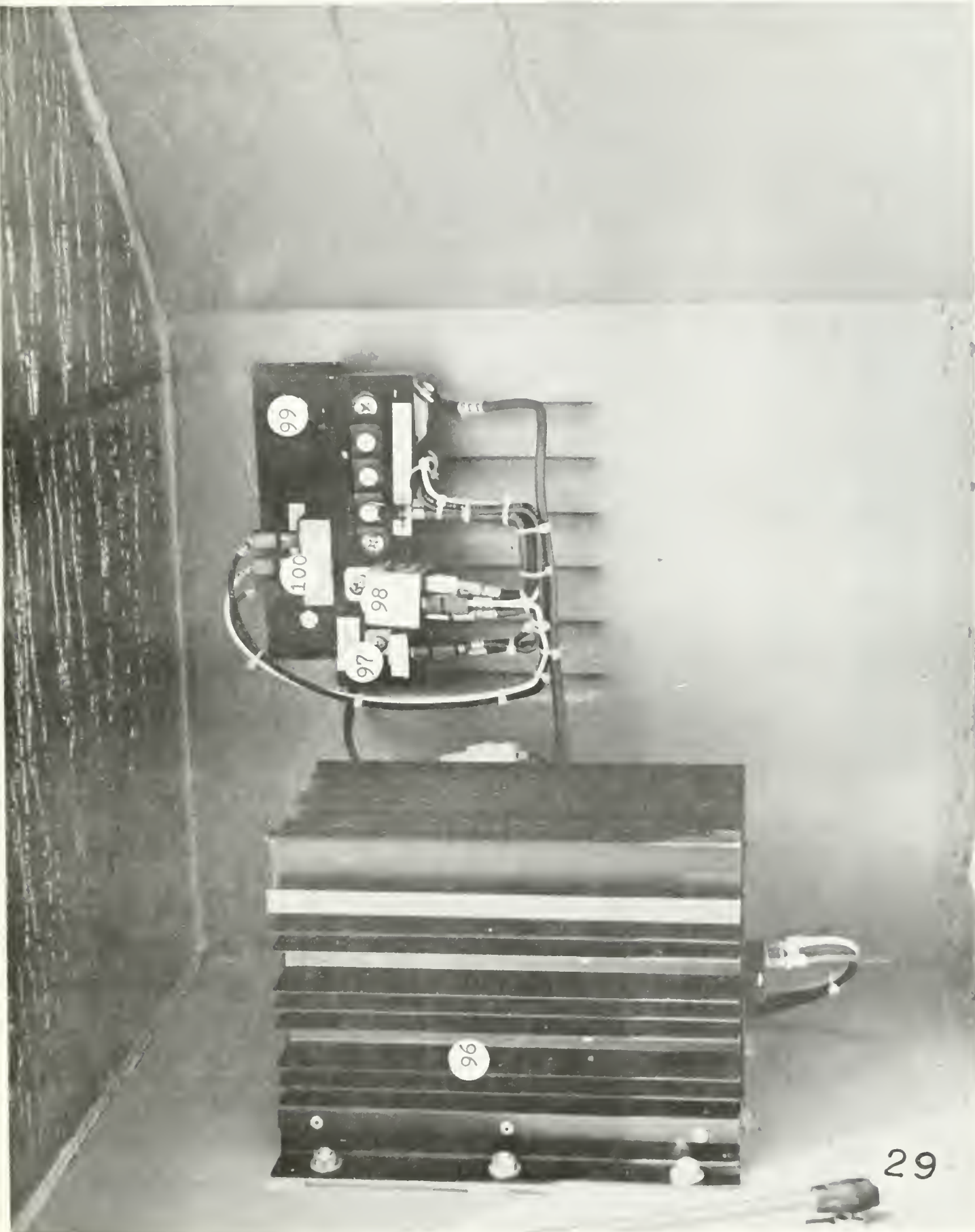


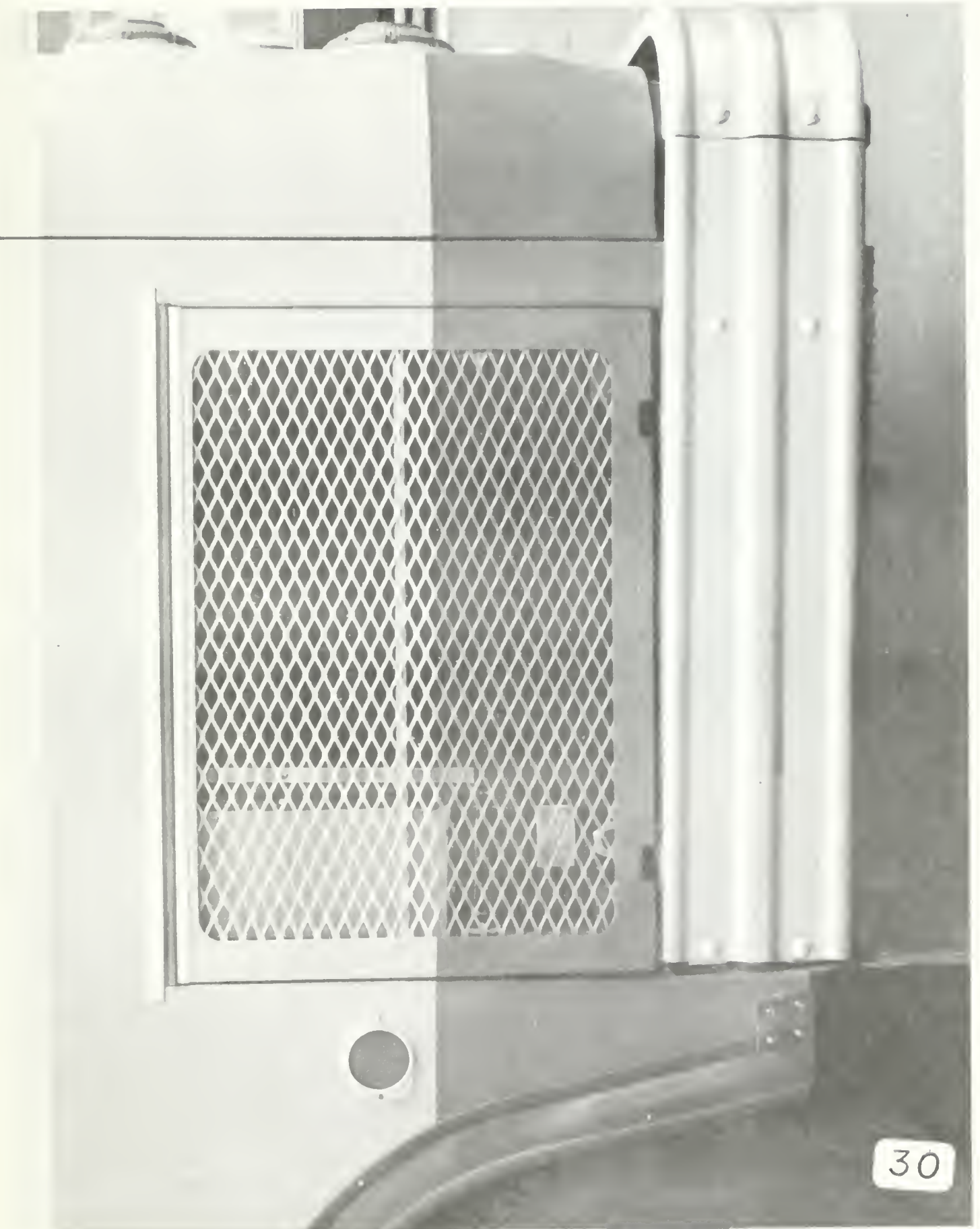
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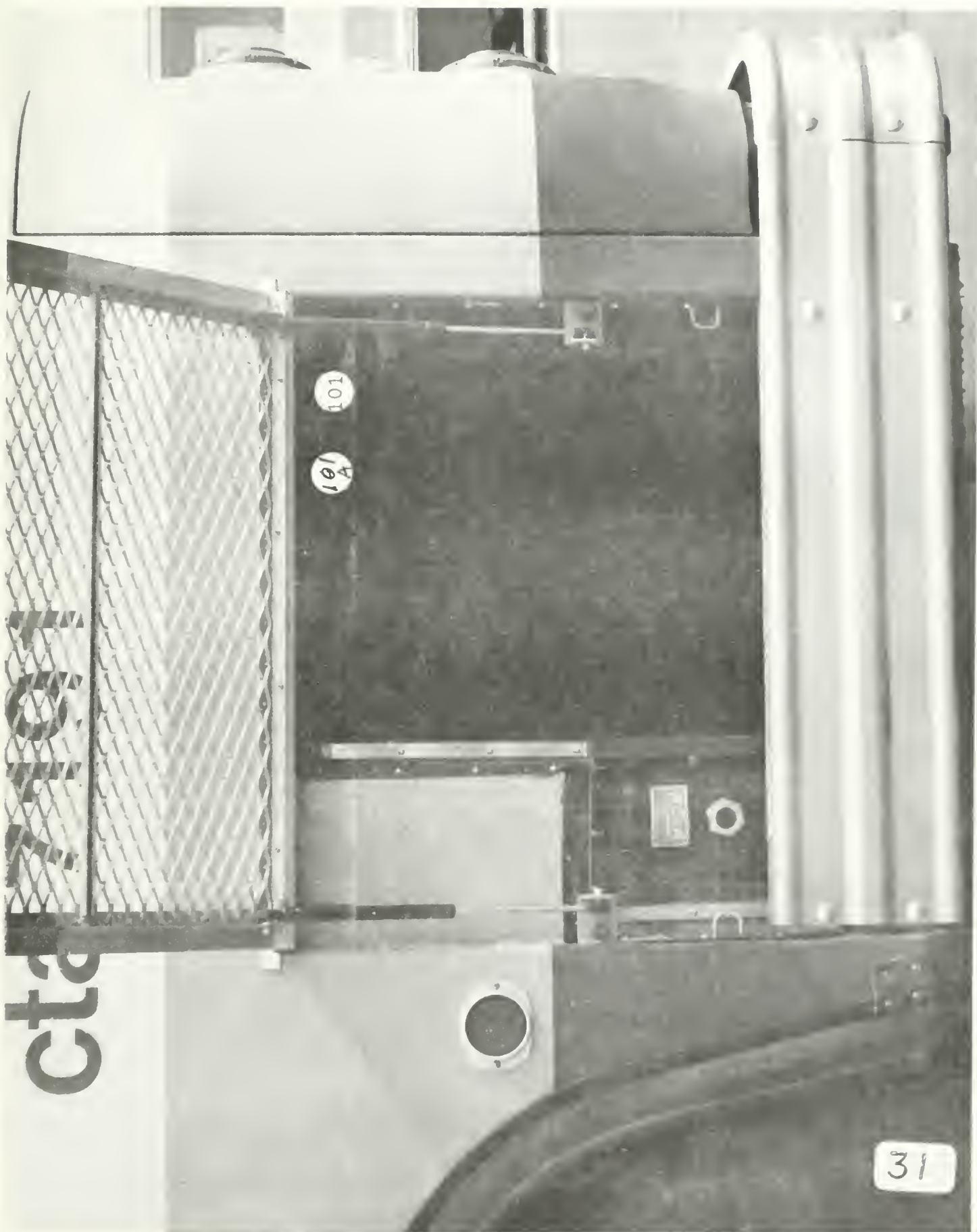
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ctg 7101





cta

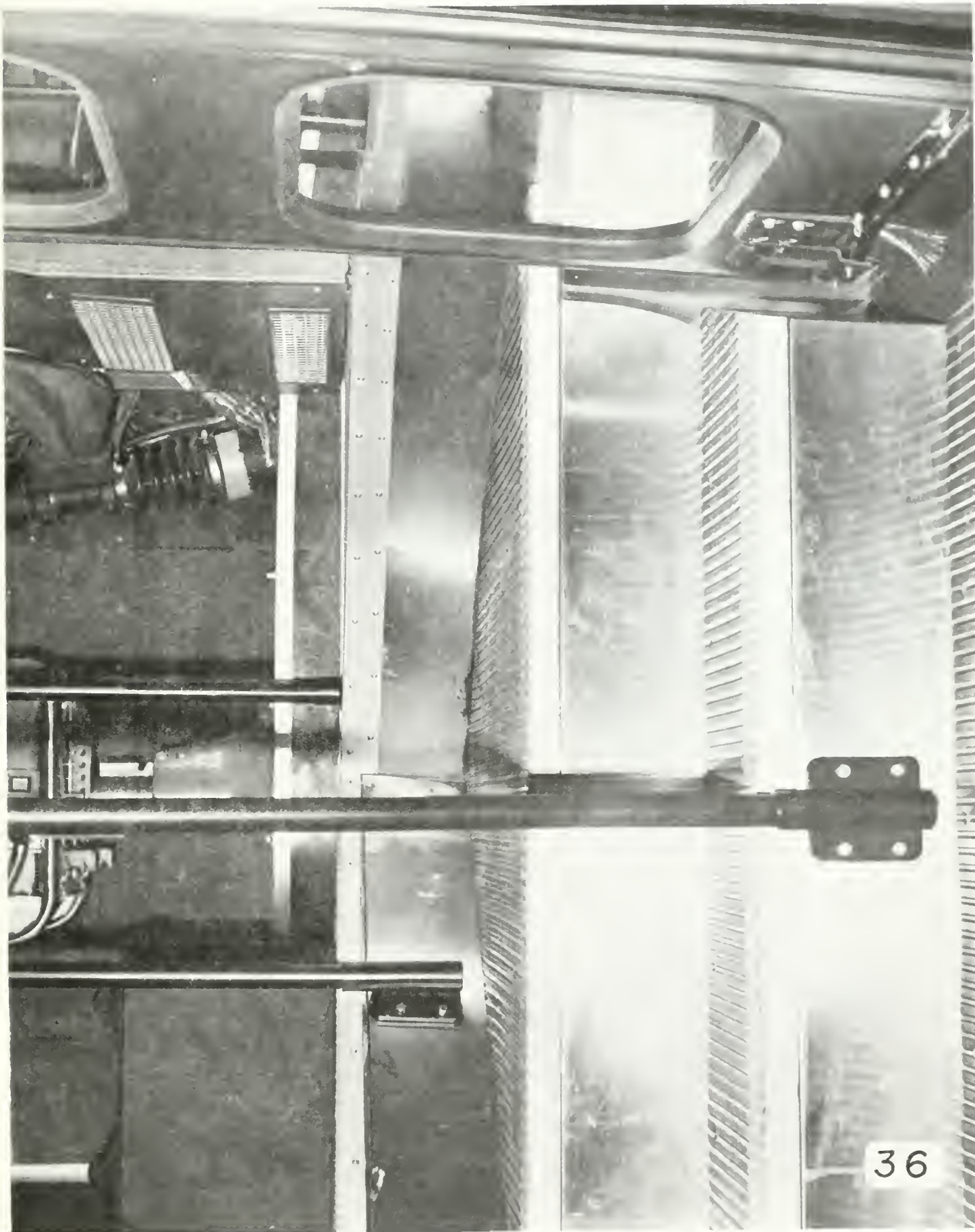
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required
Driver has
NO change
NO dollar bills

33

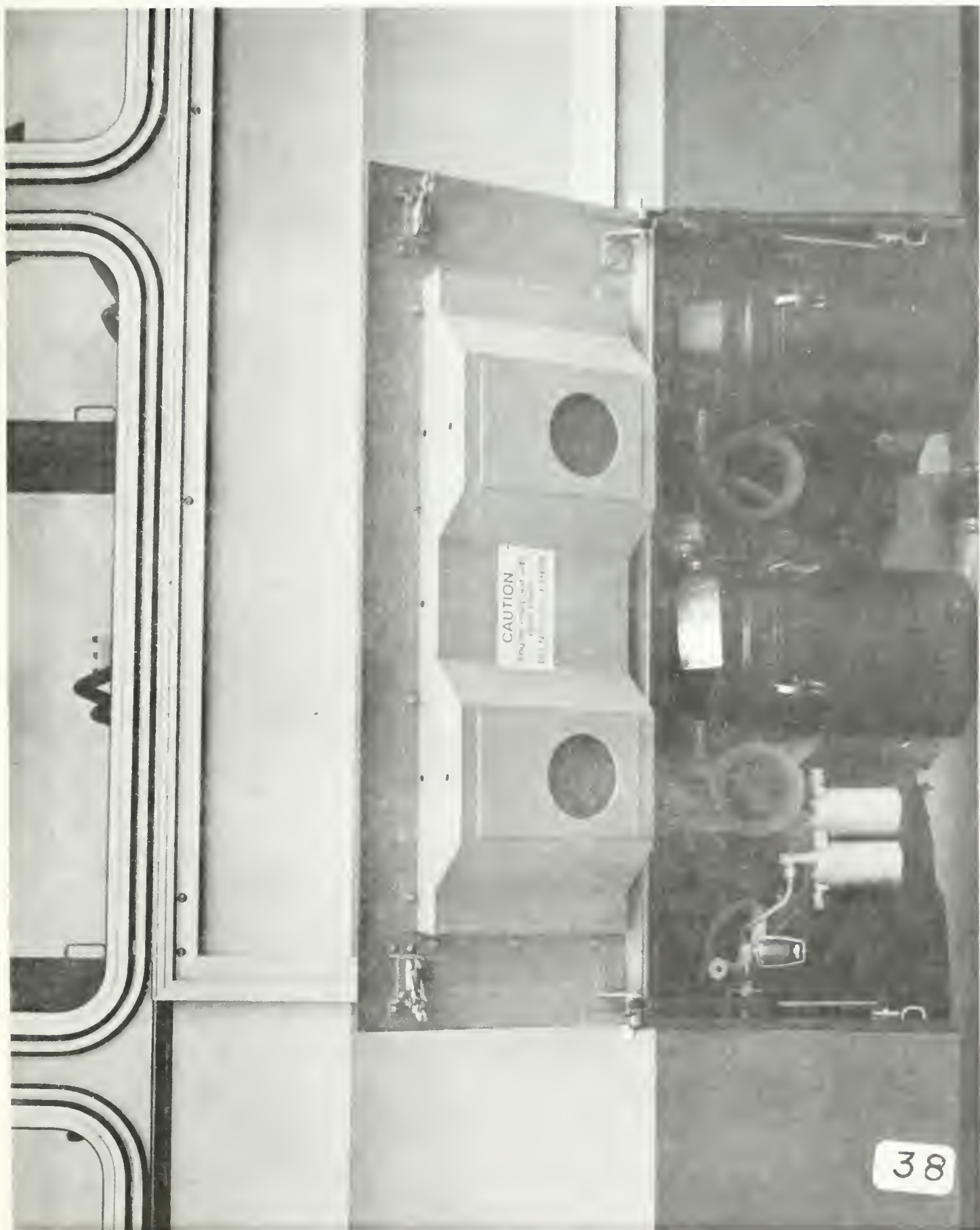


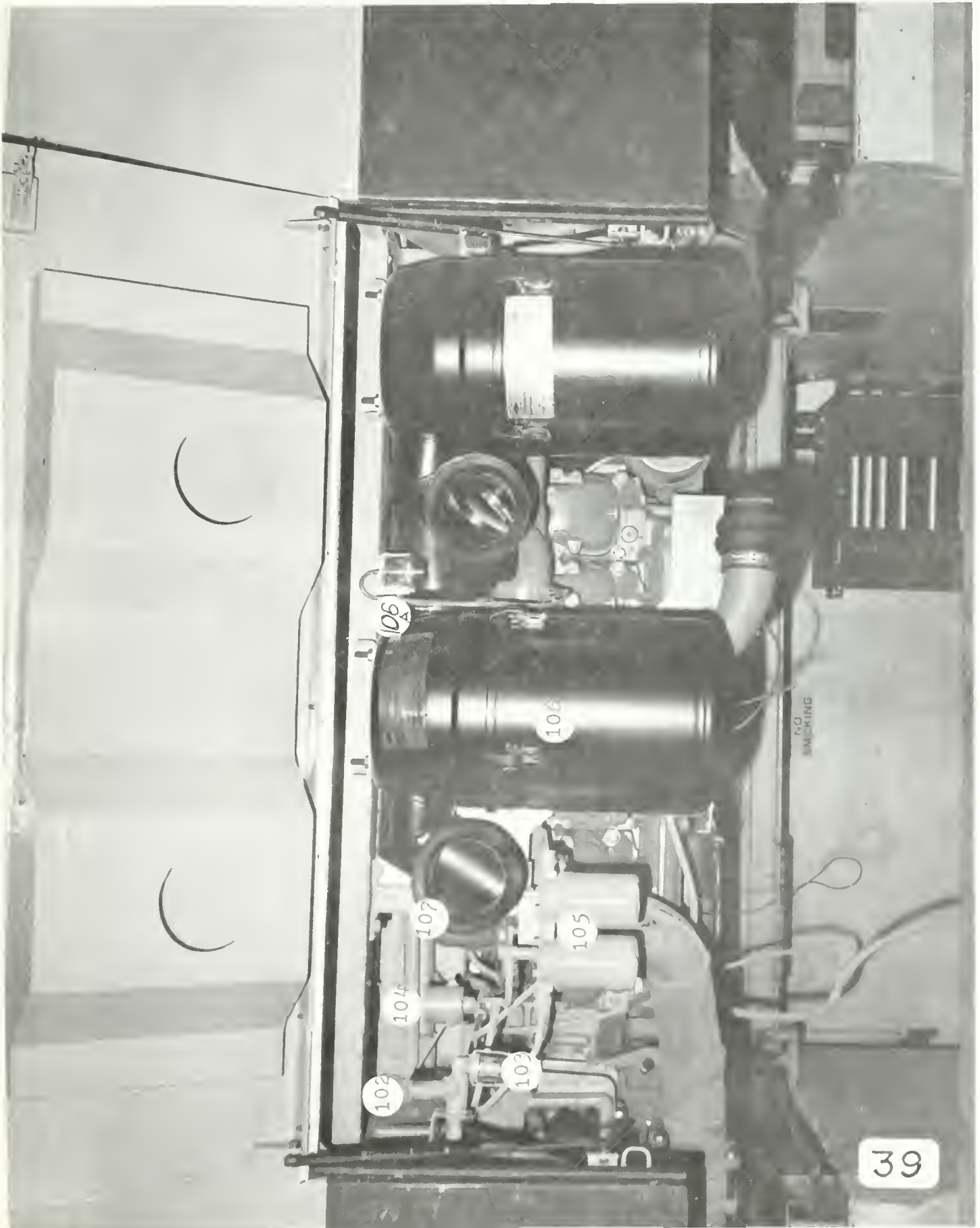


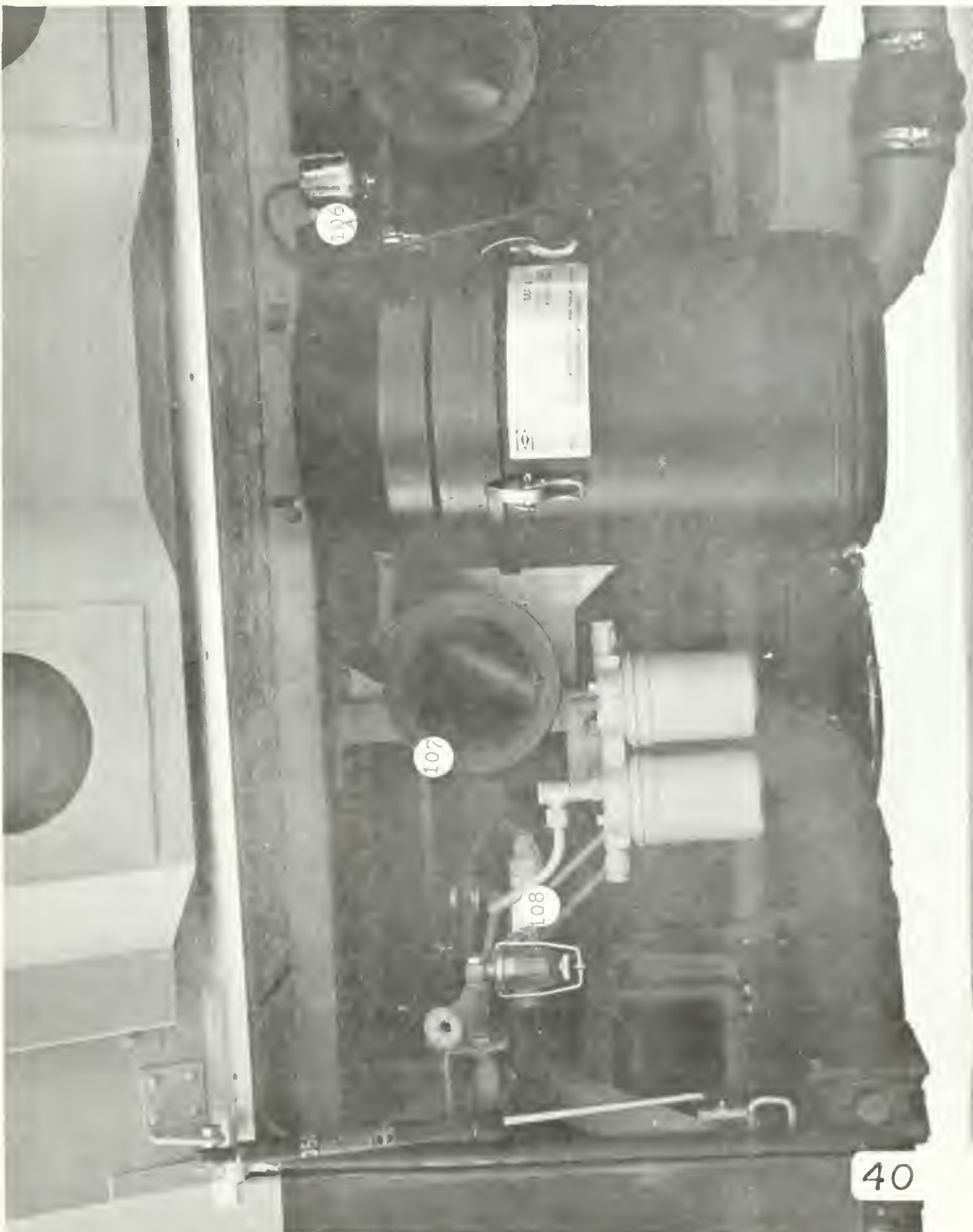


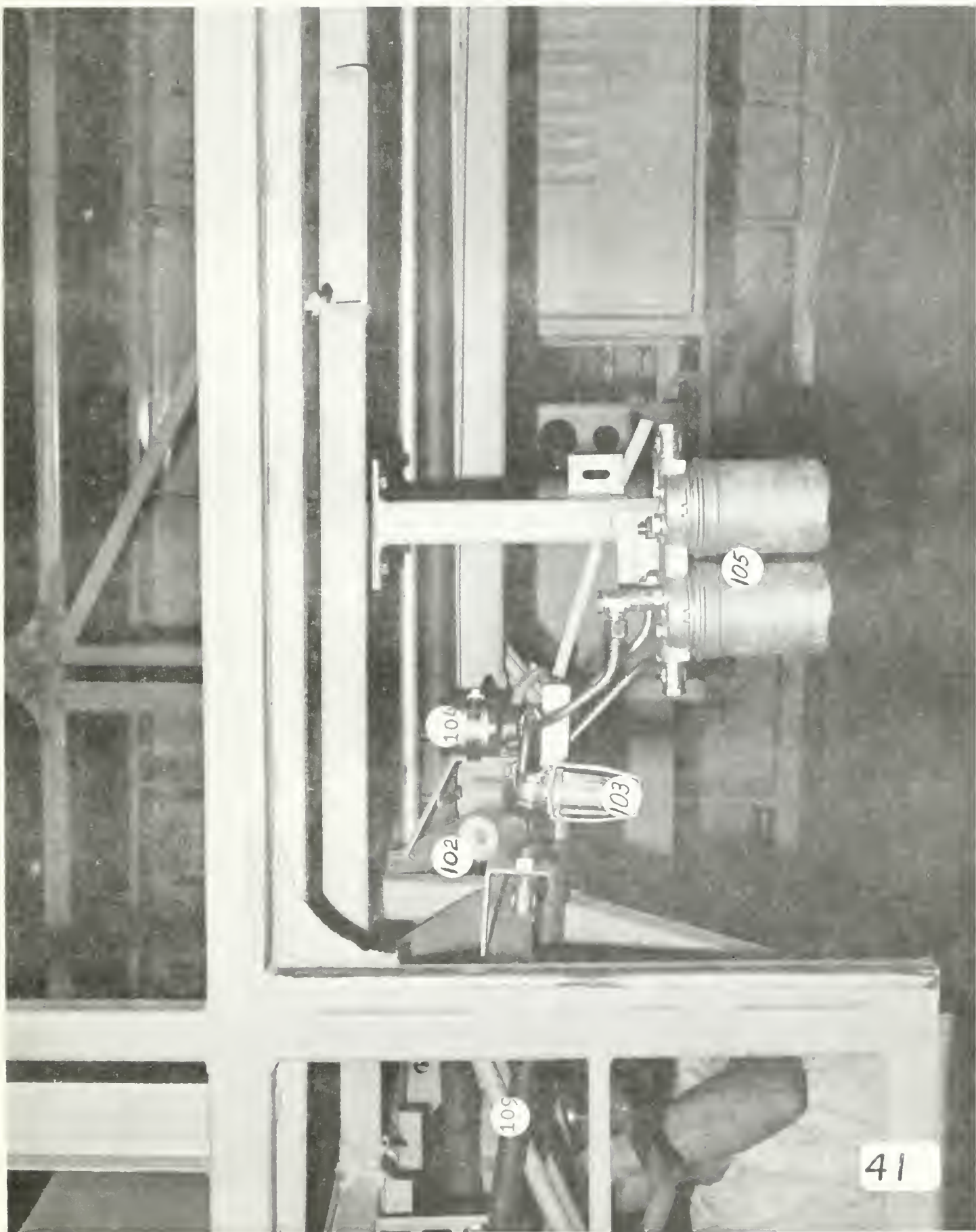


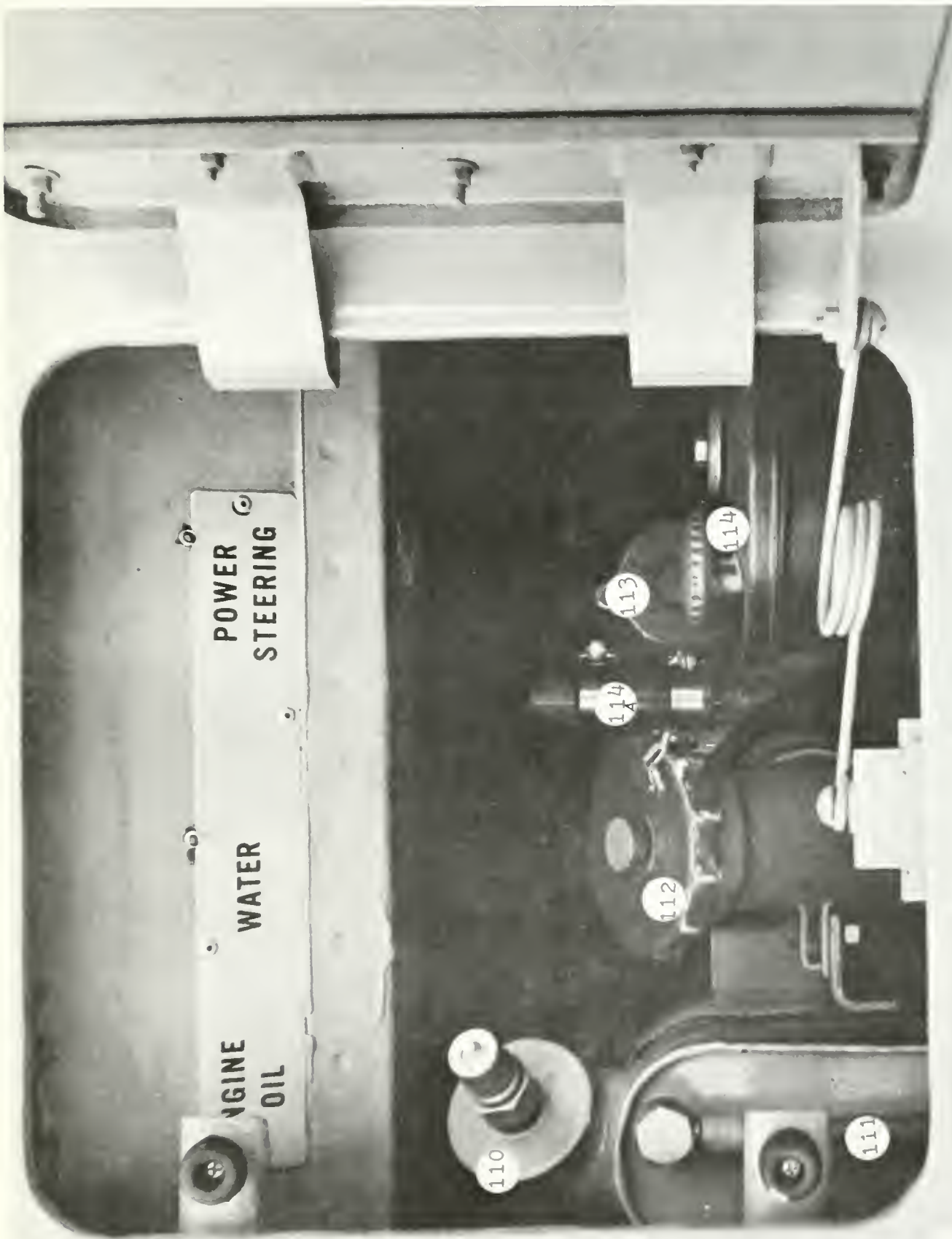


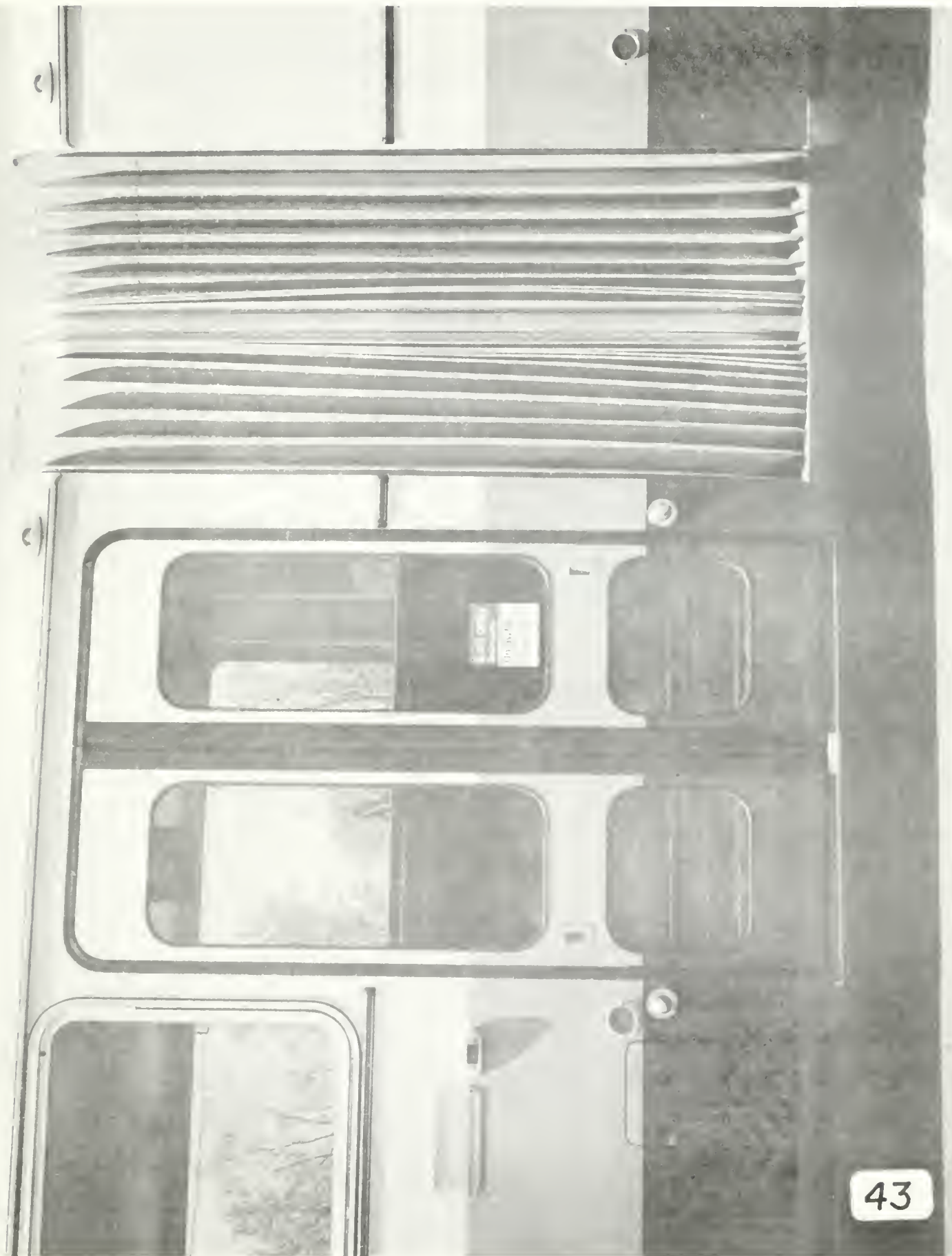






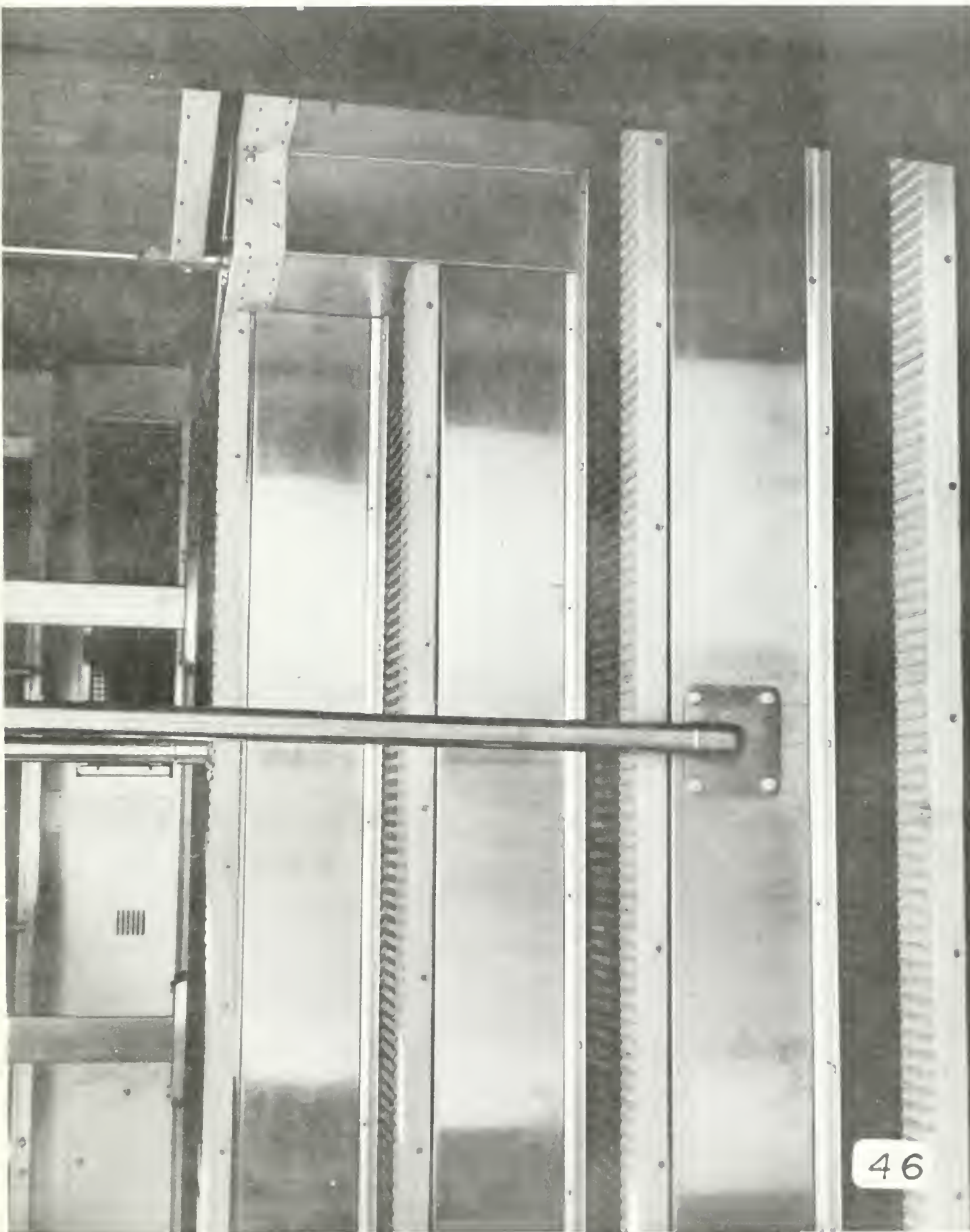




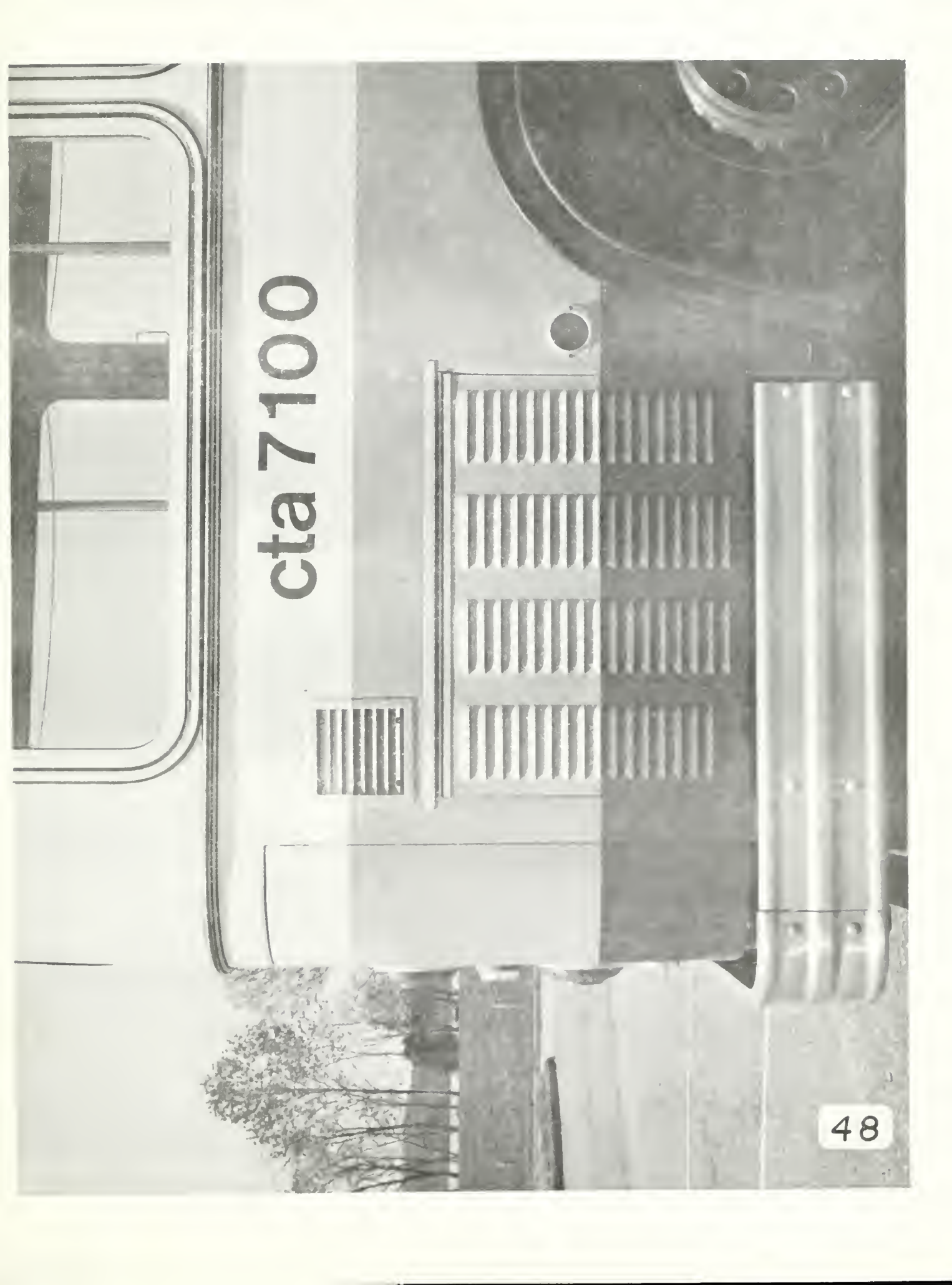




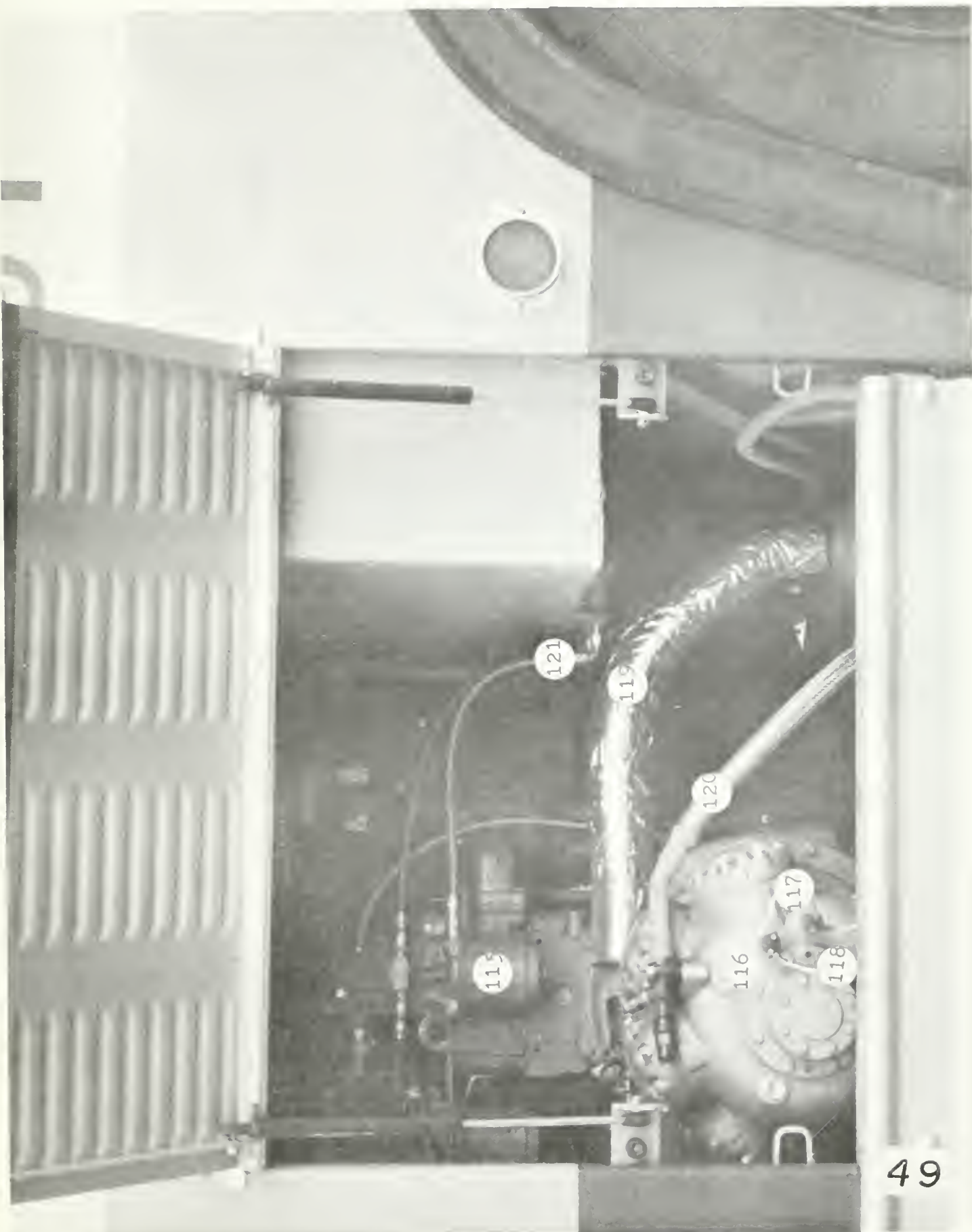


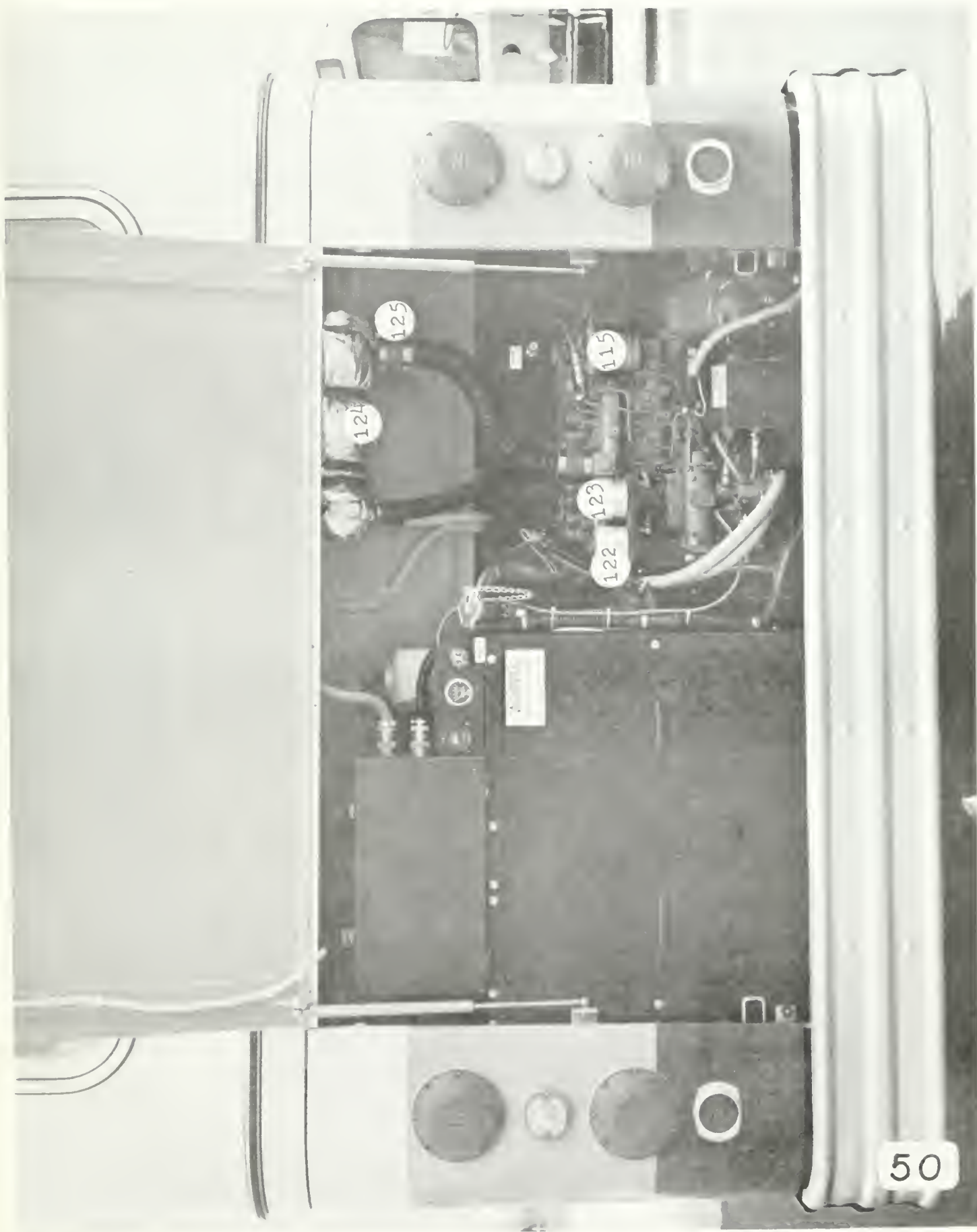


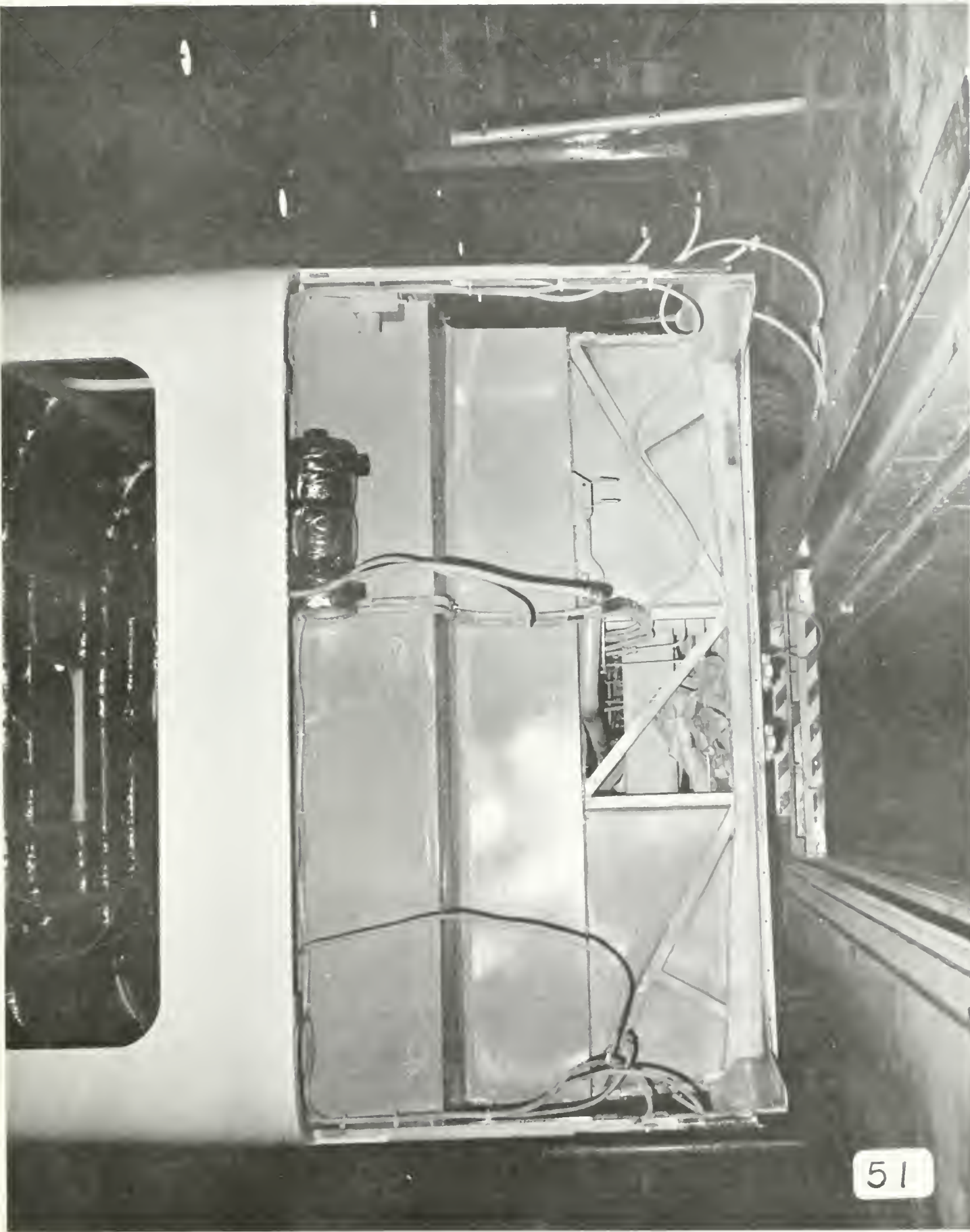




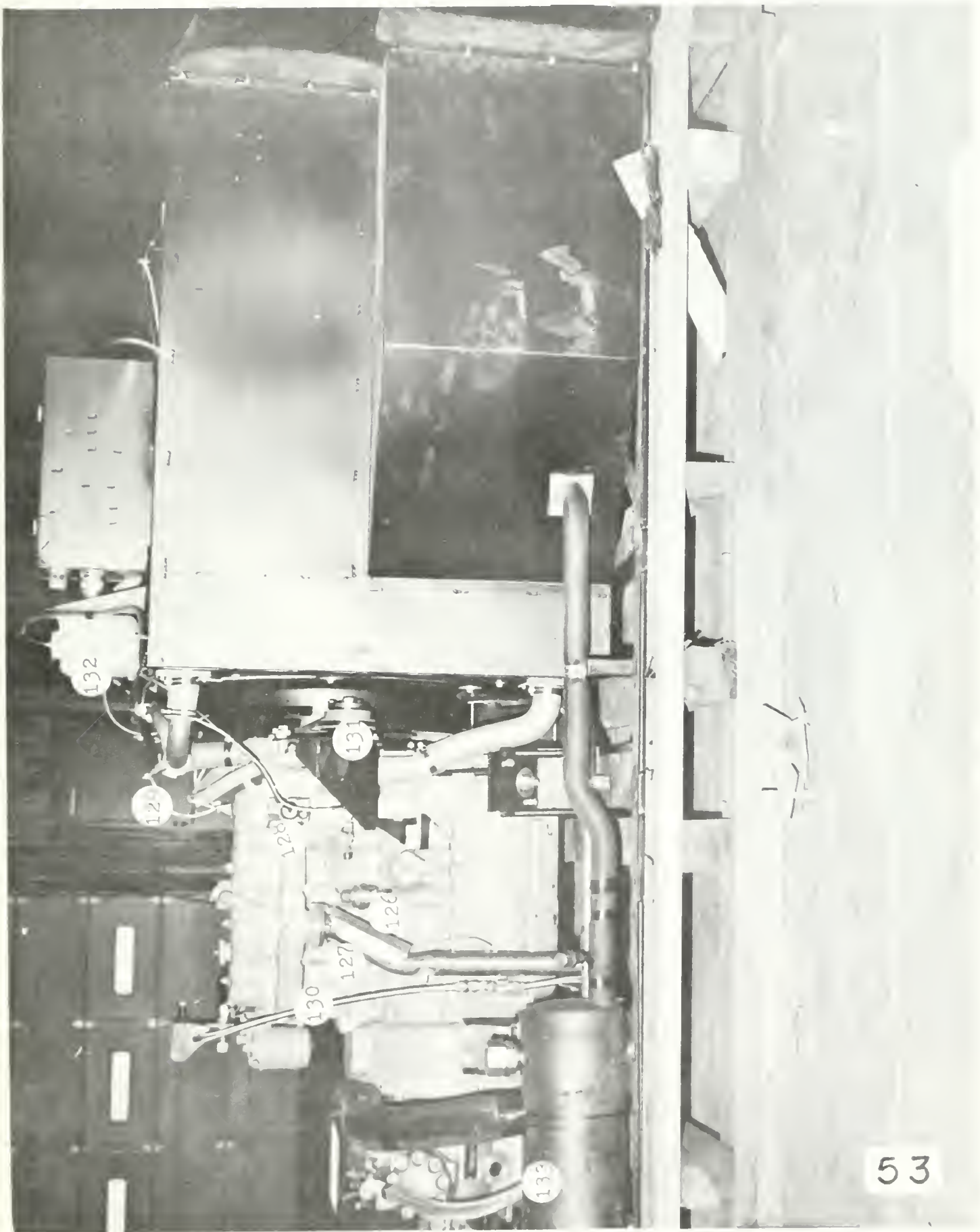
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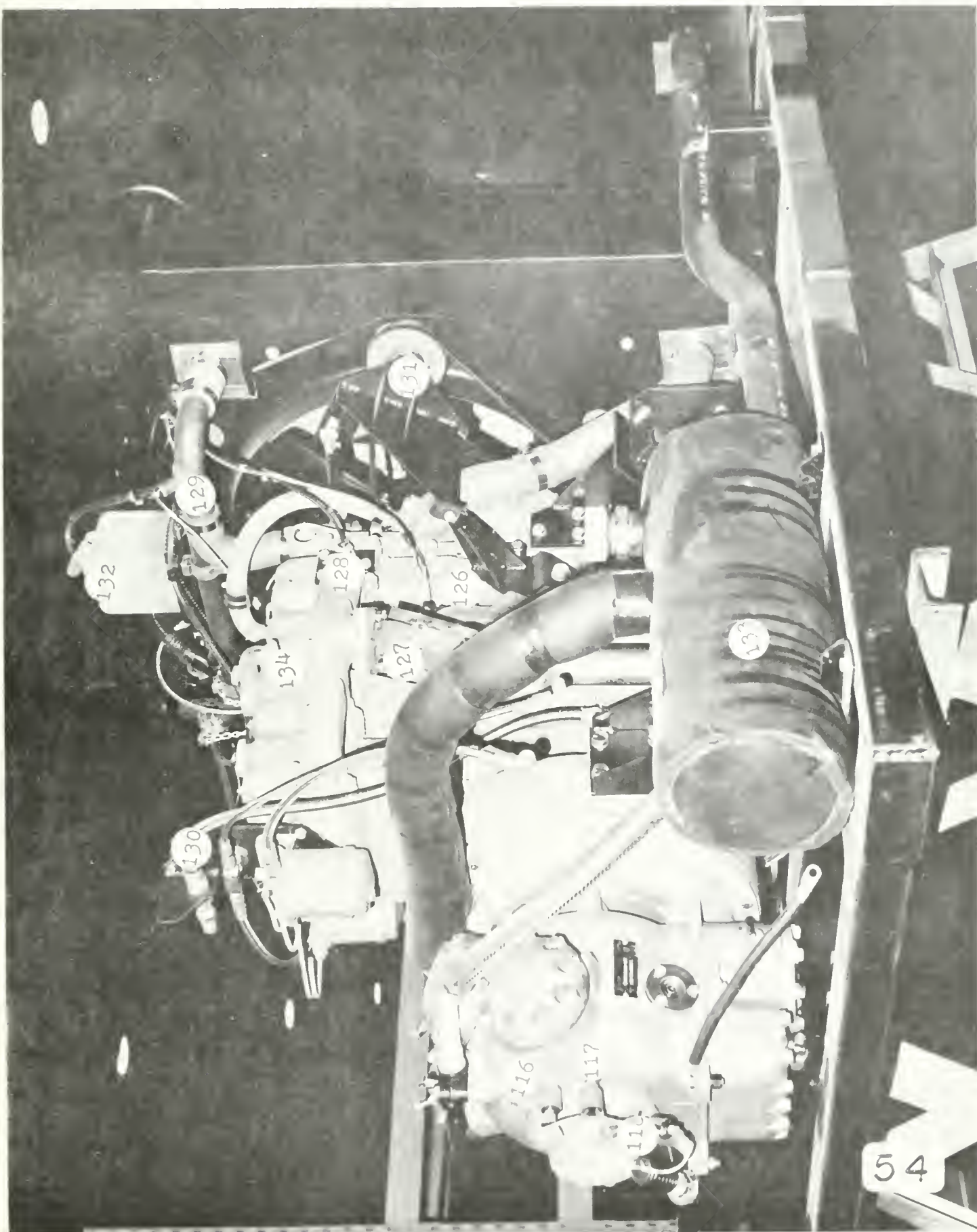


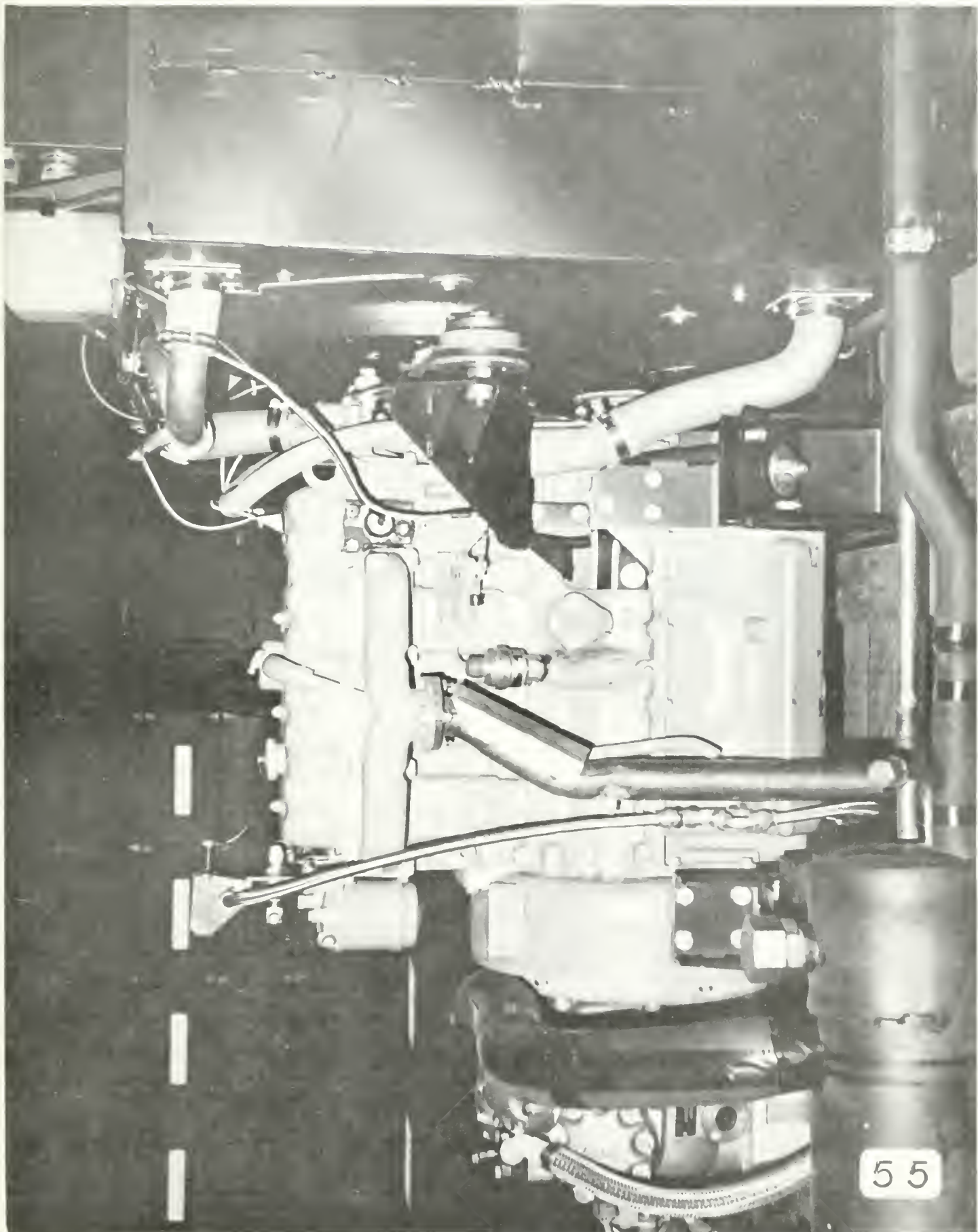


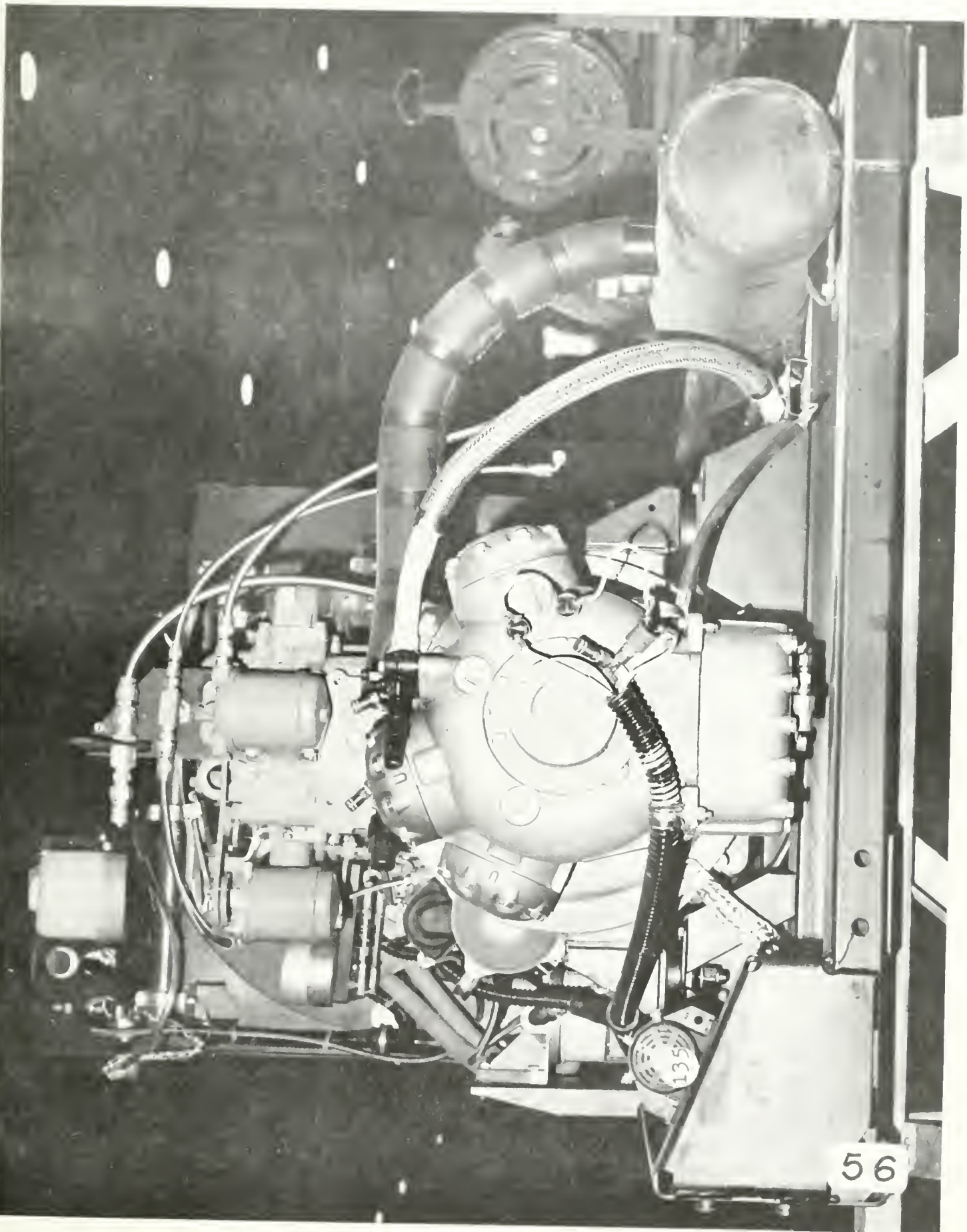


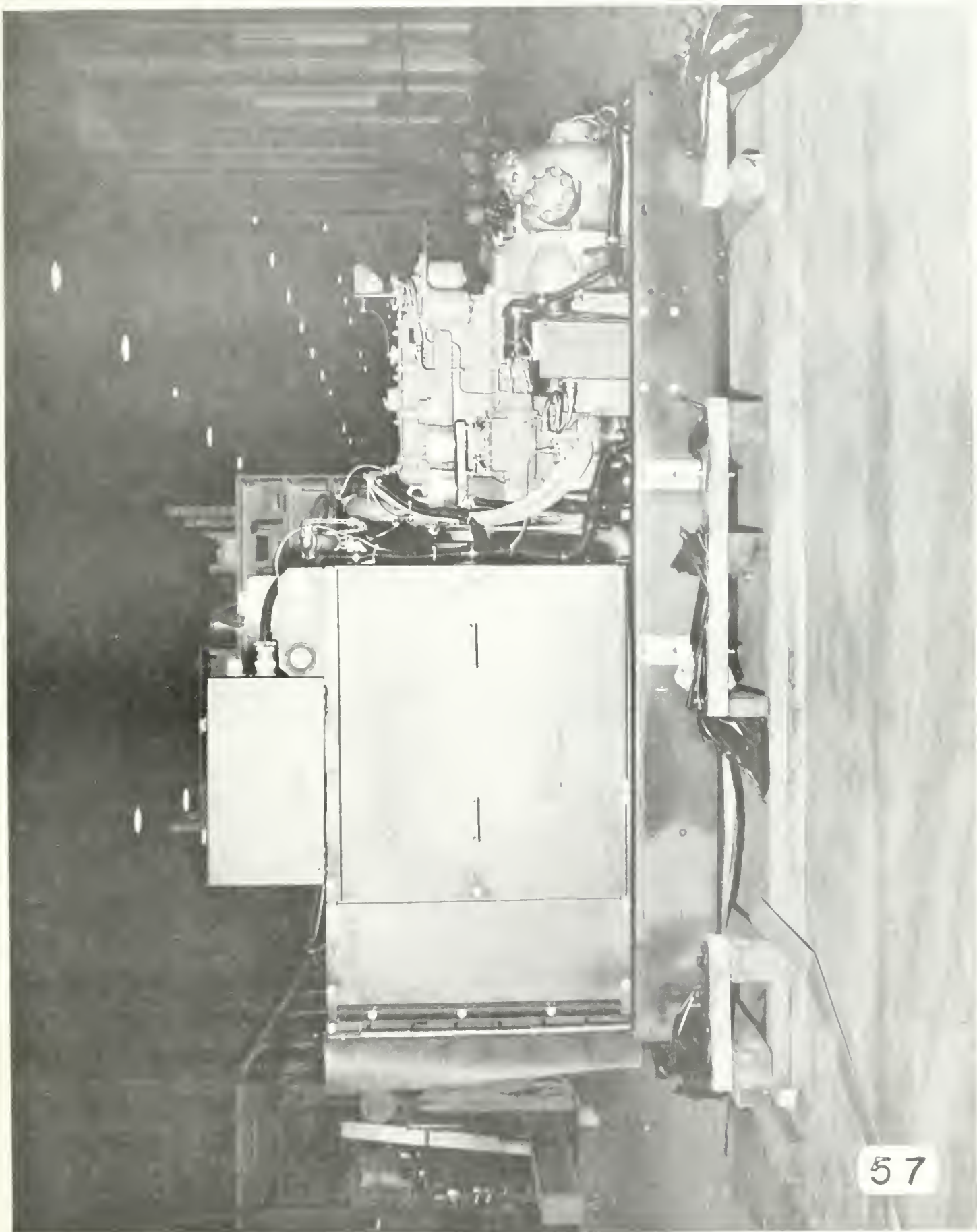


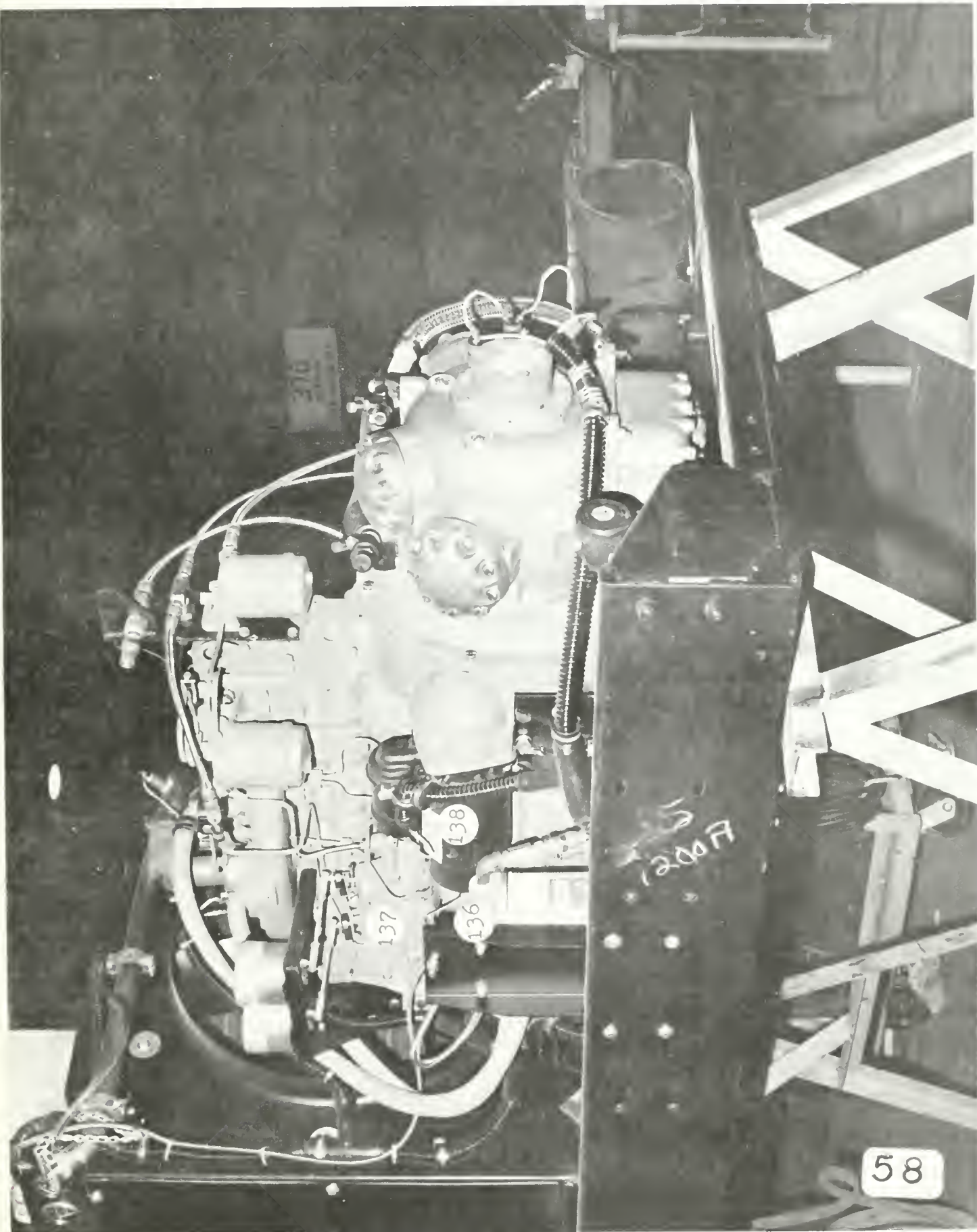


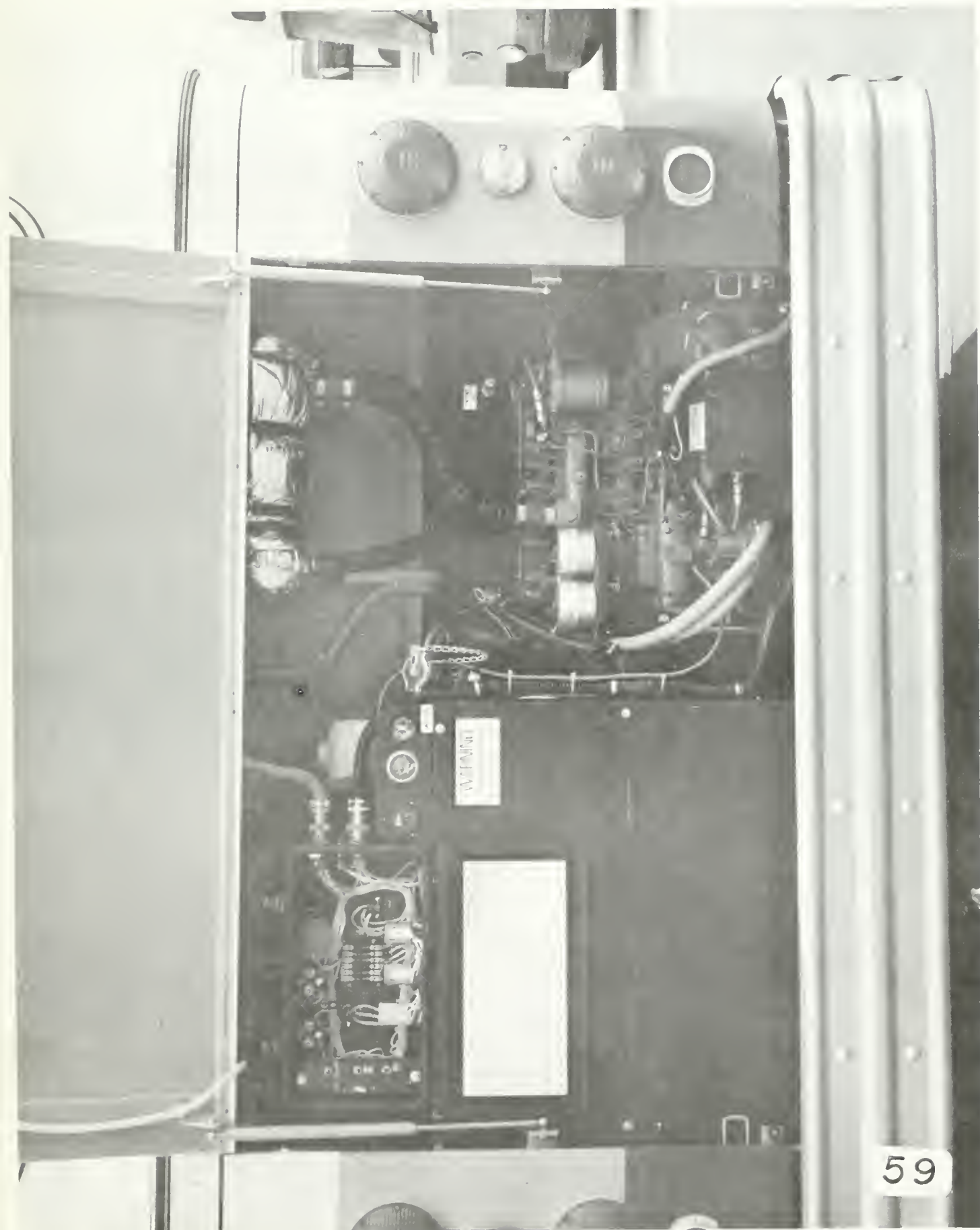


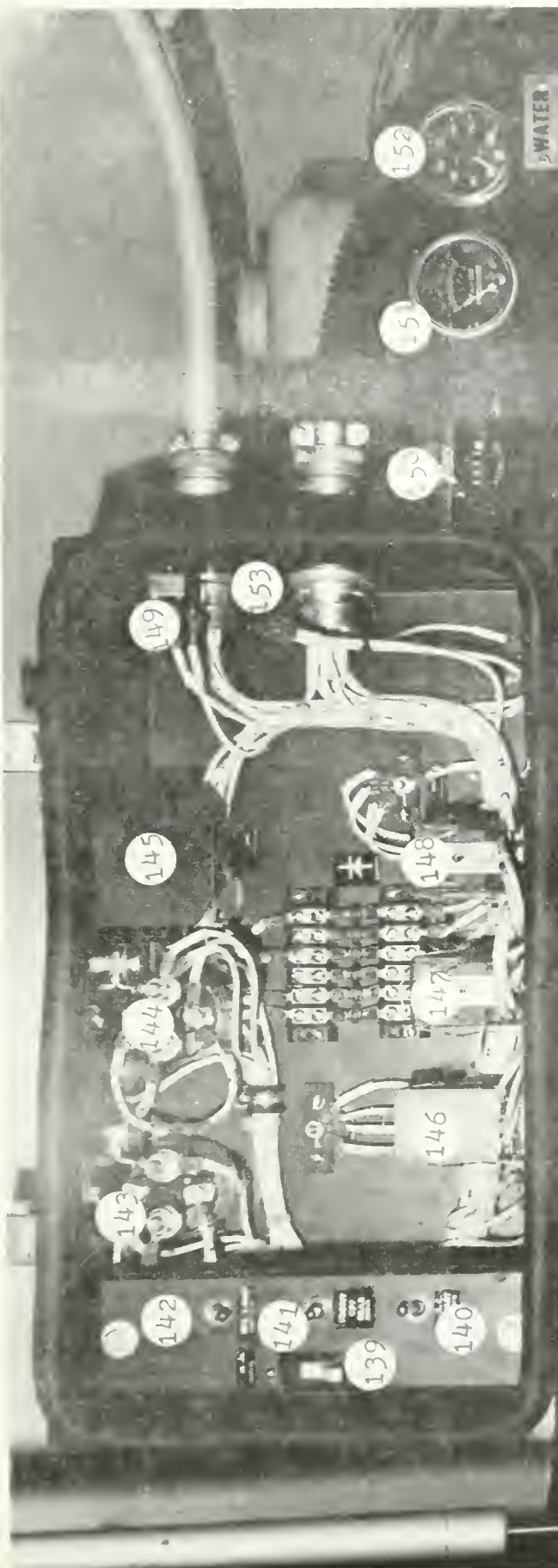








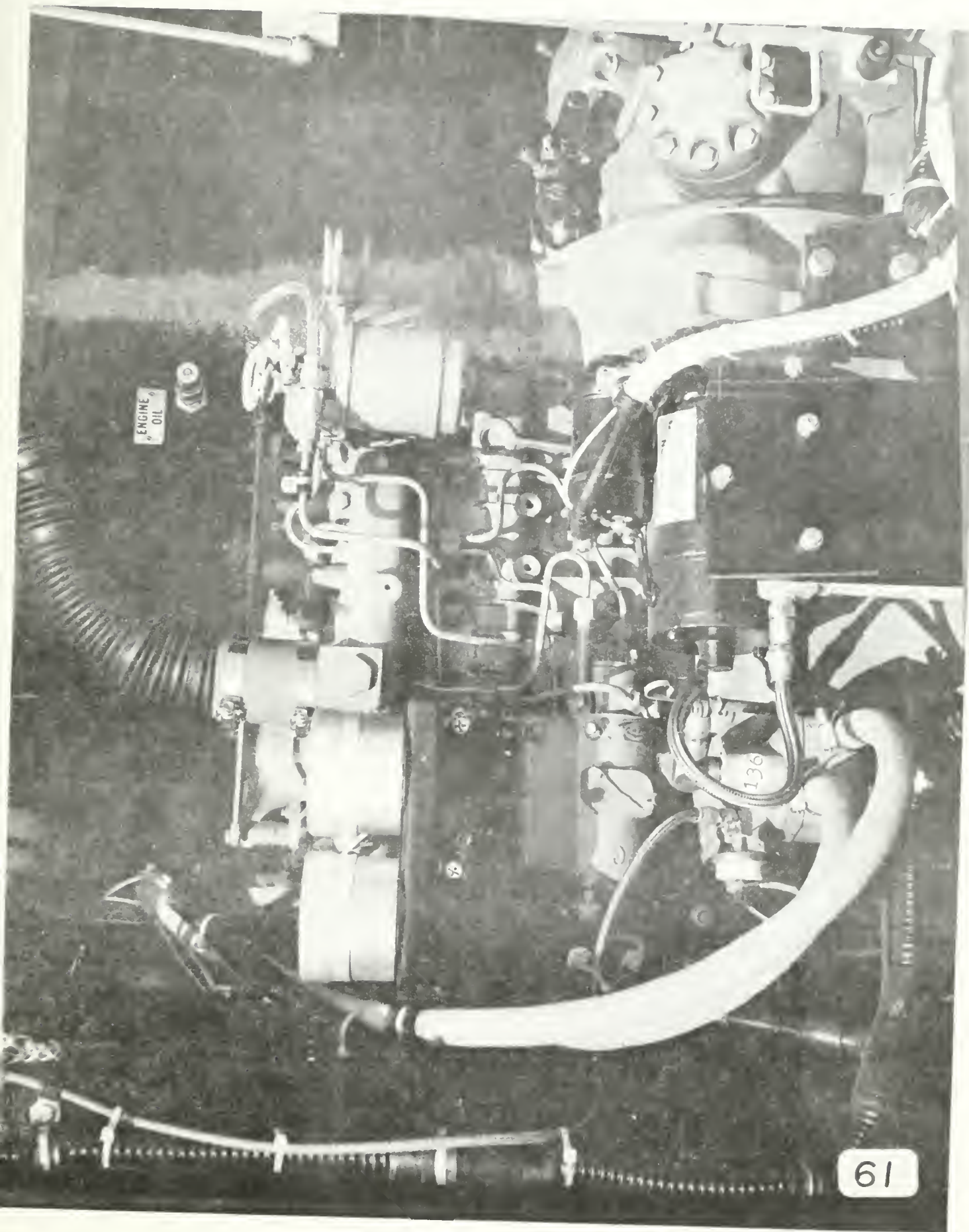


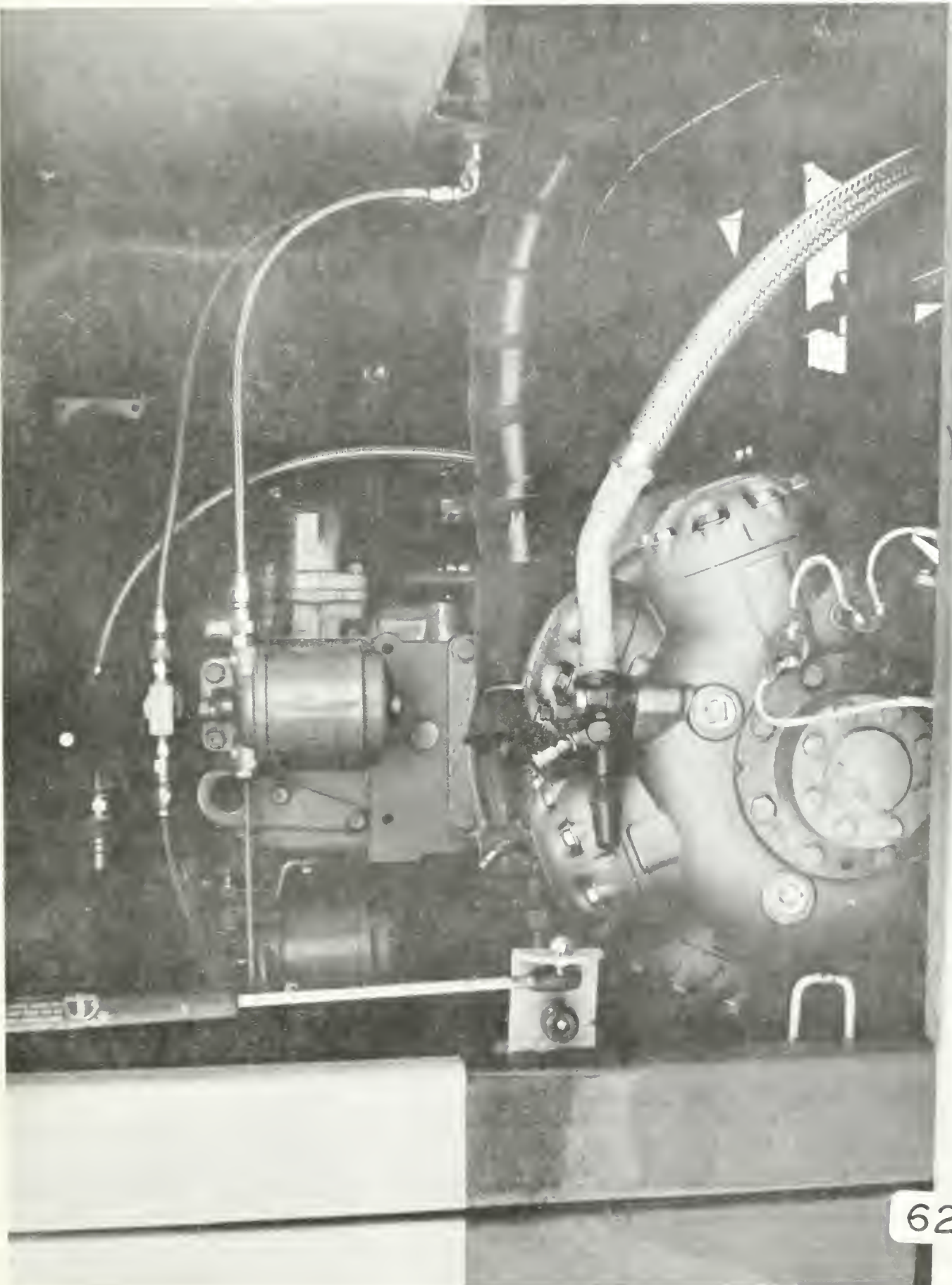


WARNING
 AIR CONDITIONING ENGINE
 CAN START AUTOMATICALLY

SYMBOL	LEGEND	DESCRIPTION
CB 46		CIRCUIT BREAKER
CR 1 2 3 4		CONTROL RELAY
LWC		LOW WATER CUTOFF
0-7 THRU 12		DIODE
143		WATER PUMP MOTOR
144		WATER PUMP MOTOR
145		WATER PUMP MOTOR
146		WATER PUMP MOTOR
147		WATER PUMP MOTOR
148		WATER PUMP MOTOR
149		WATER PUMP MOTOR
150		WATER PUMP MOTOR
151		WATER PUMP MOTOR
152		WATER PUMP MOTOR
153		WATER PUMP MOTOR

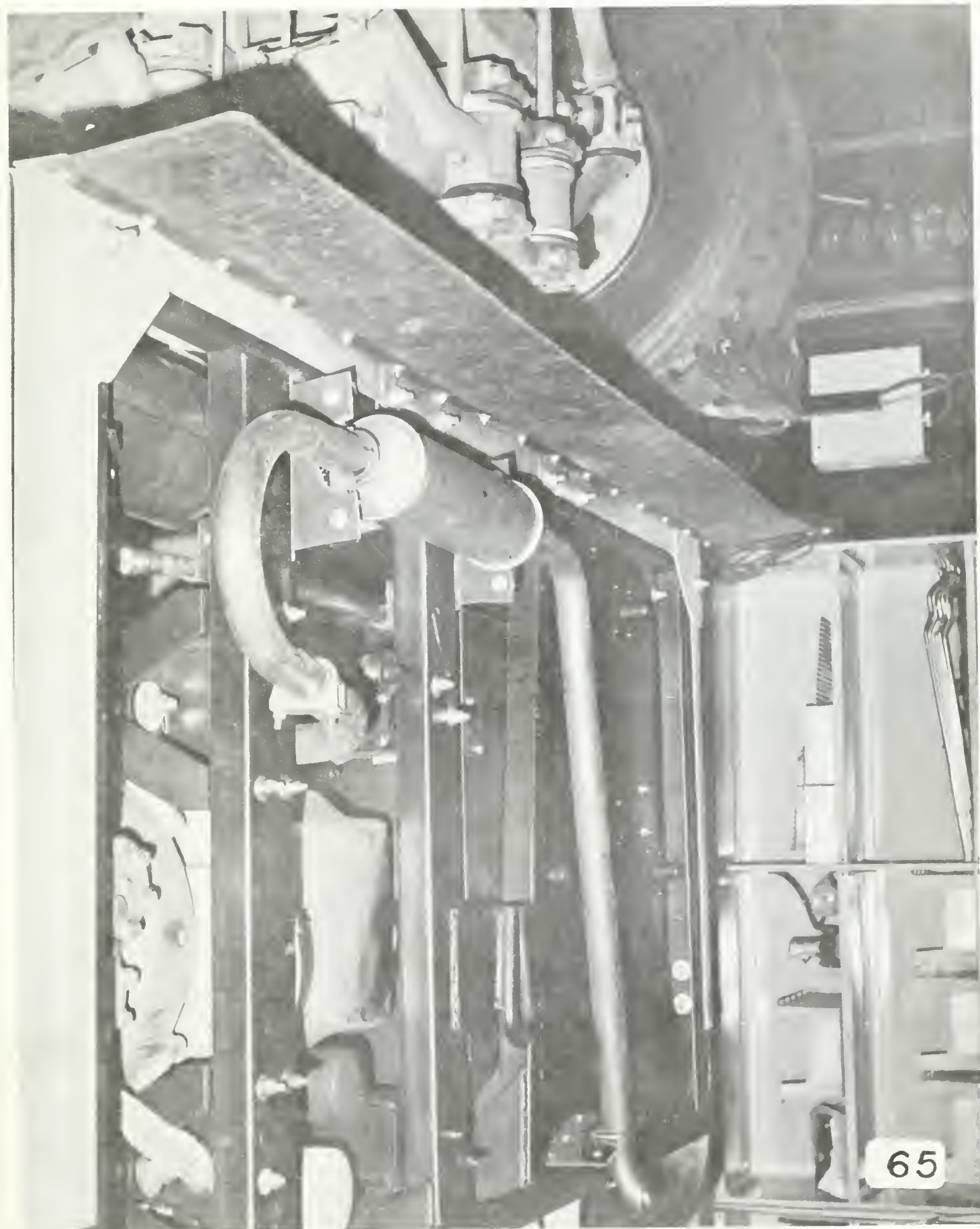
LOCATIONS
 143 144 145 146 147 148 149 150 151 152 153

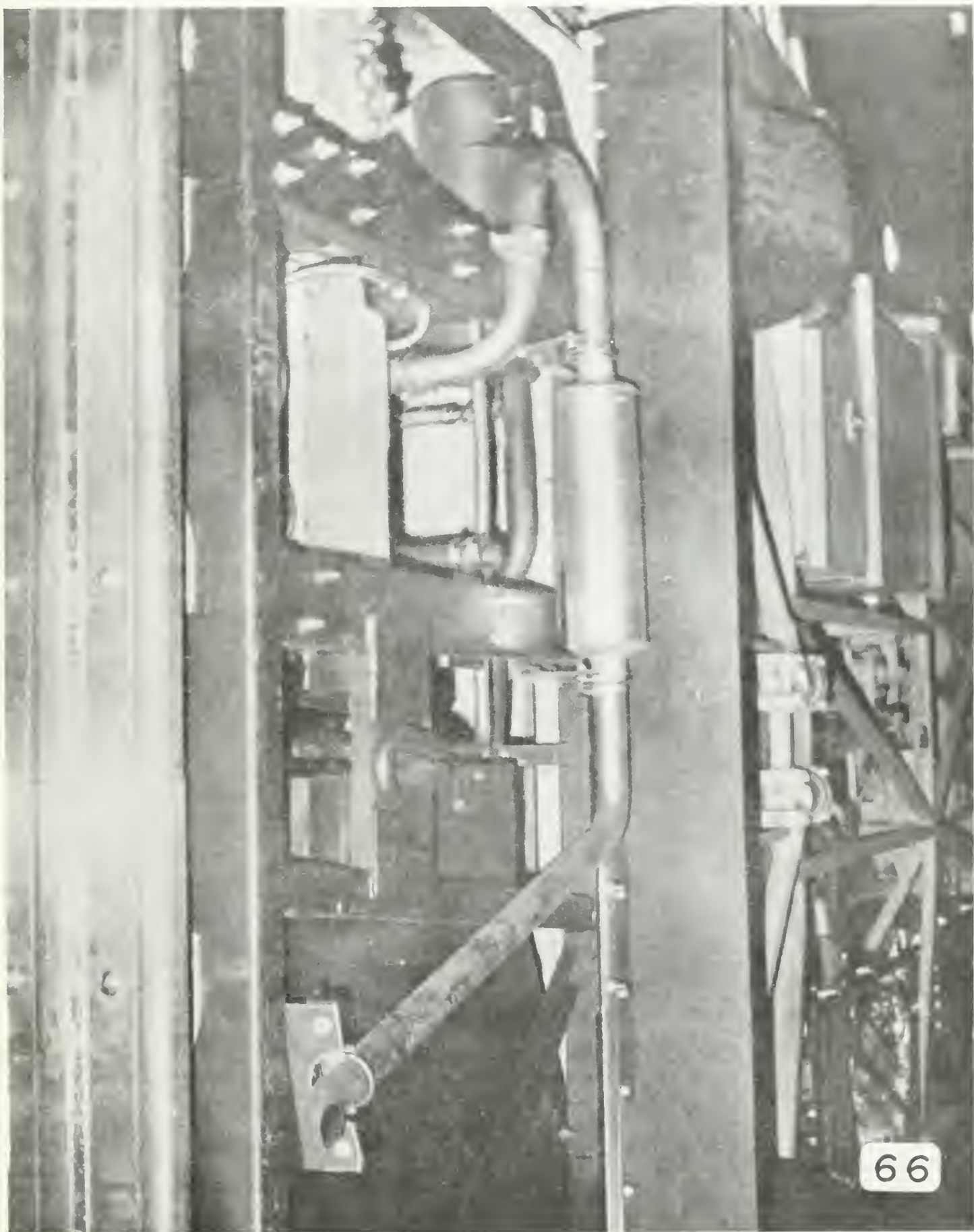


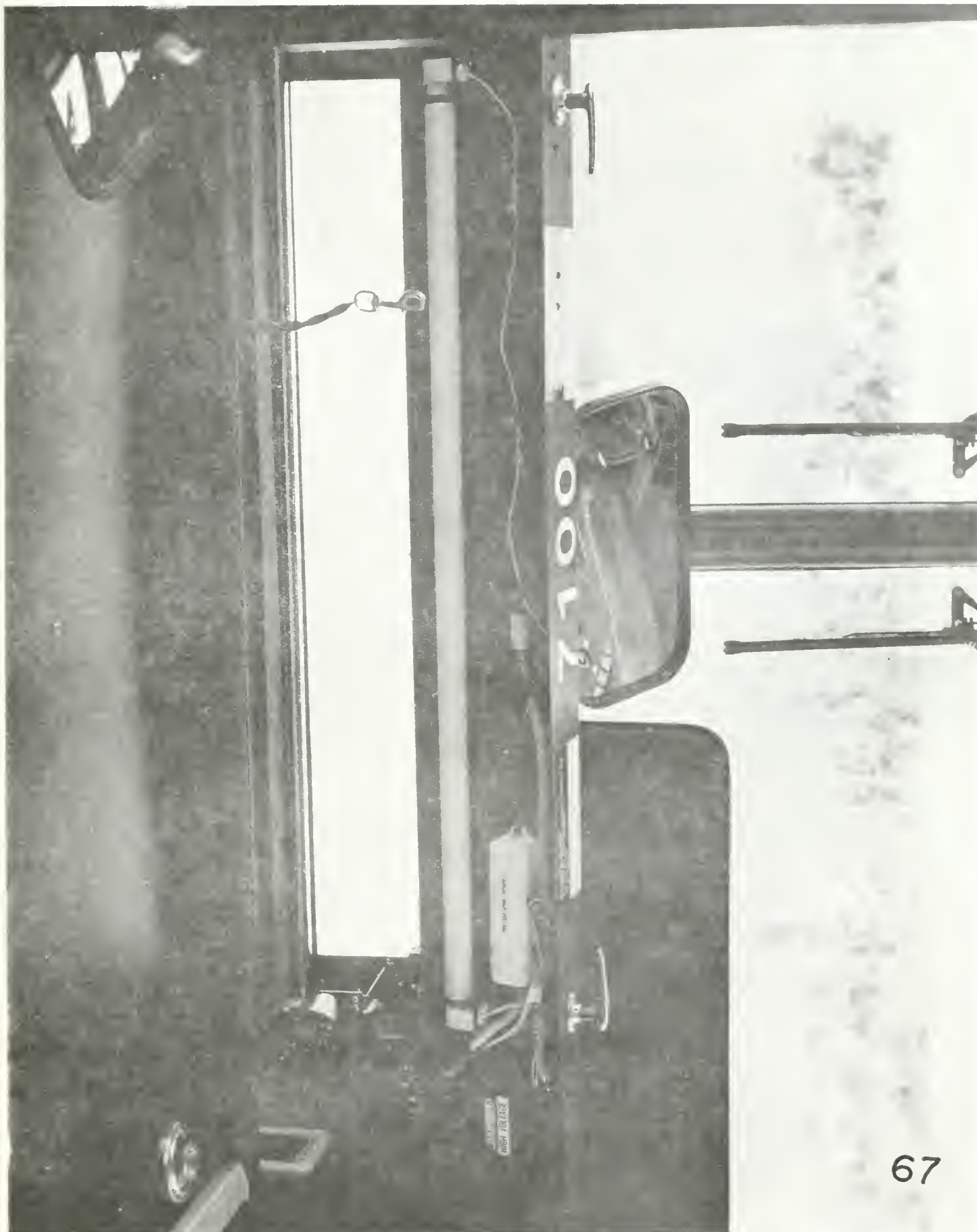


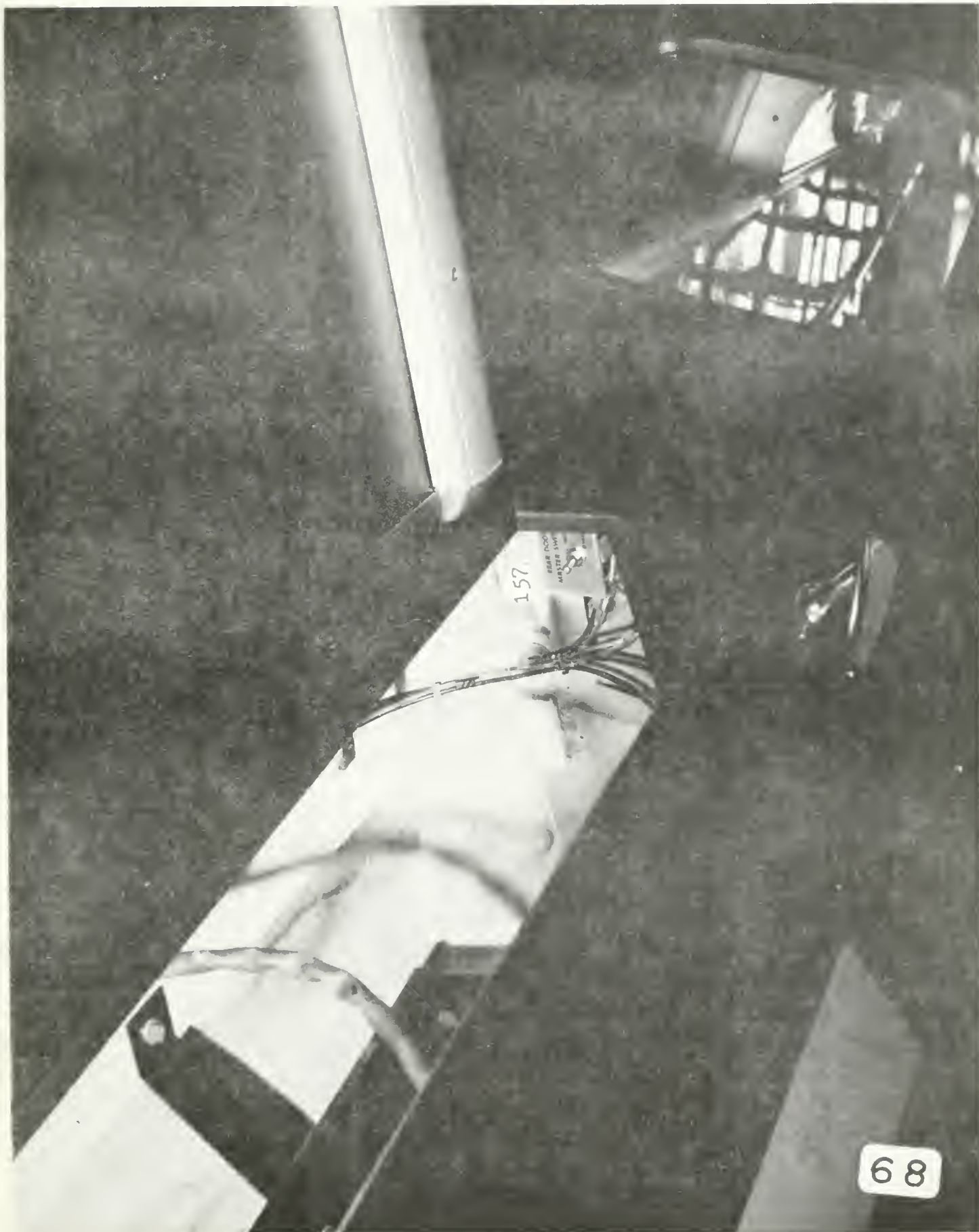




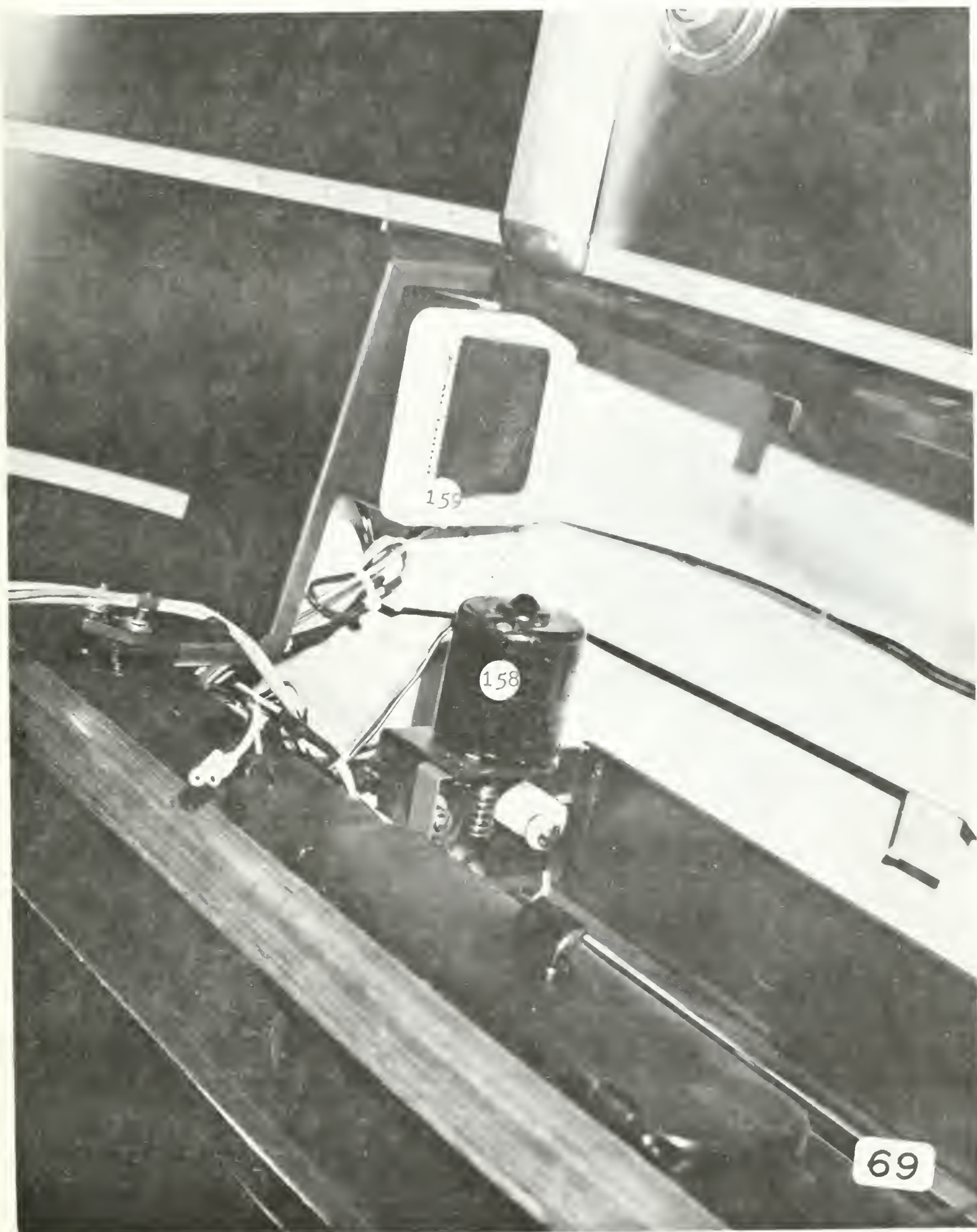


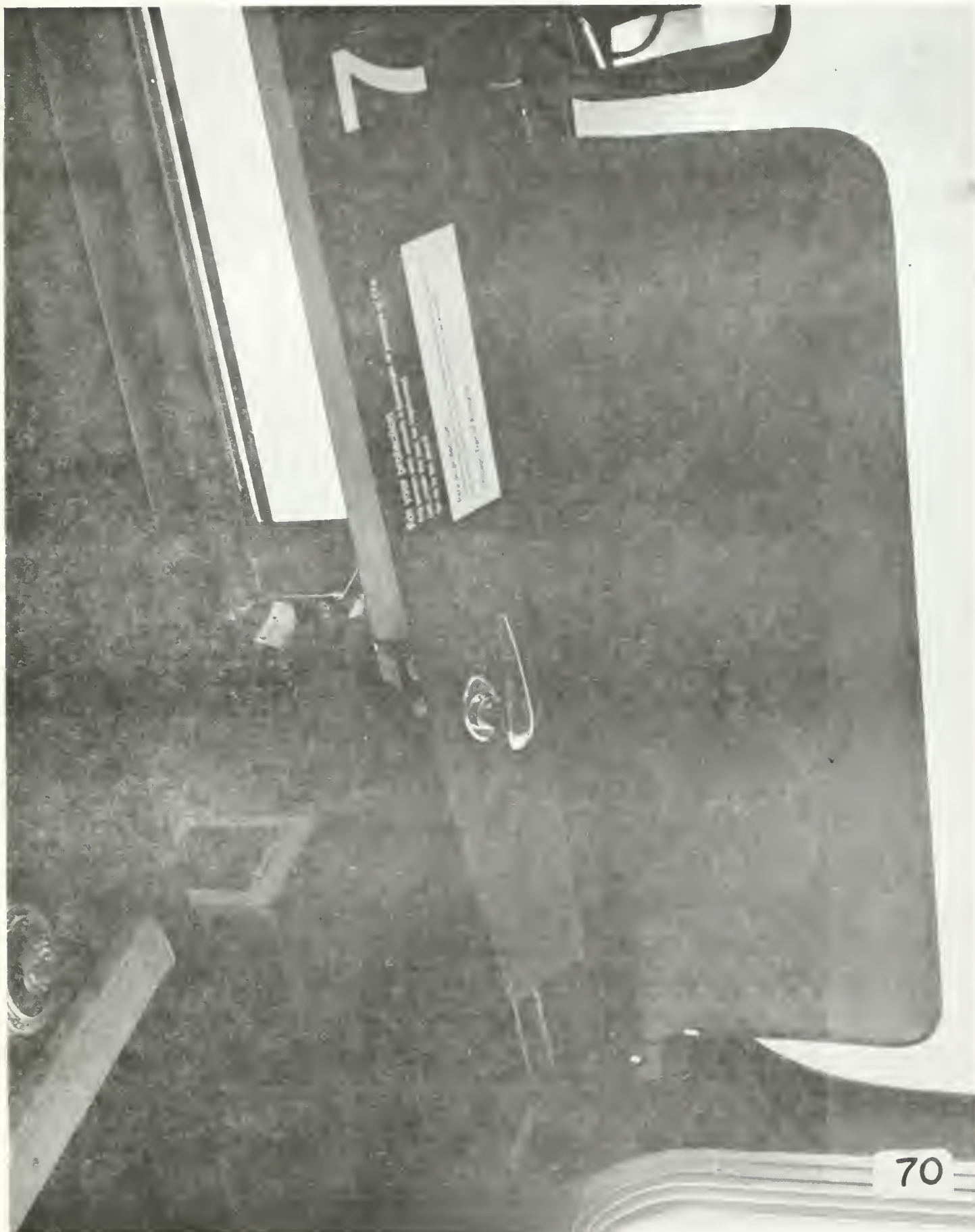




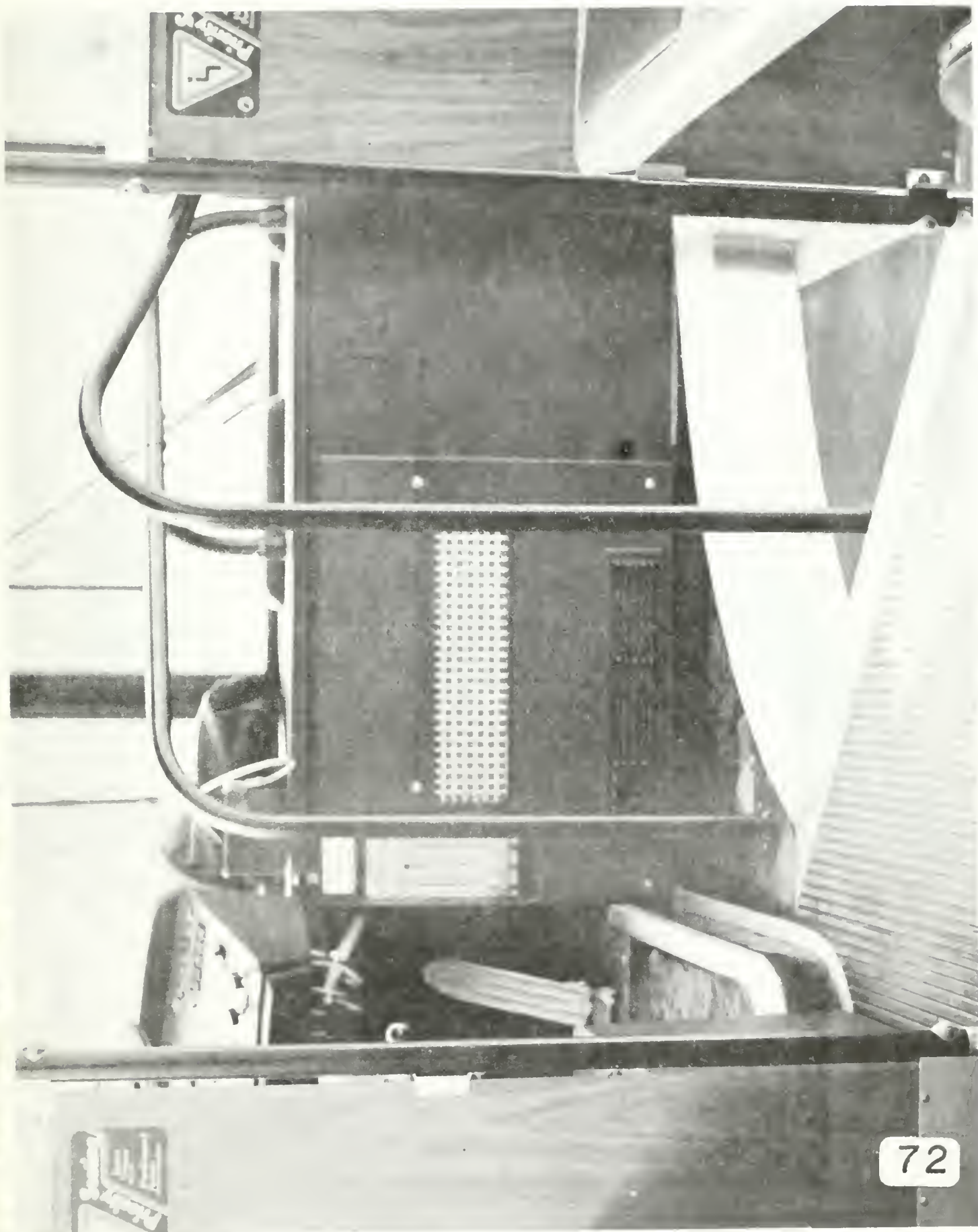


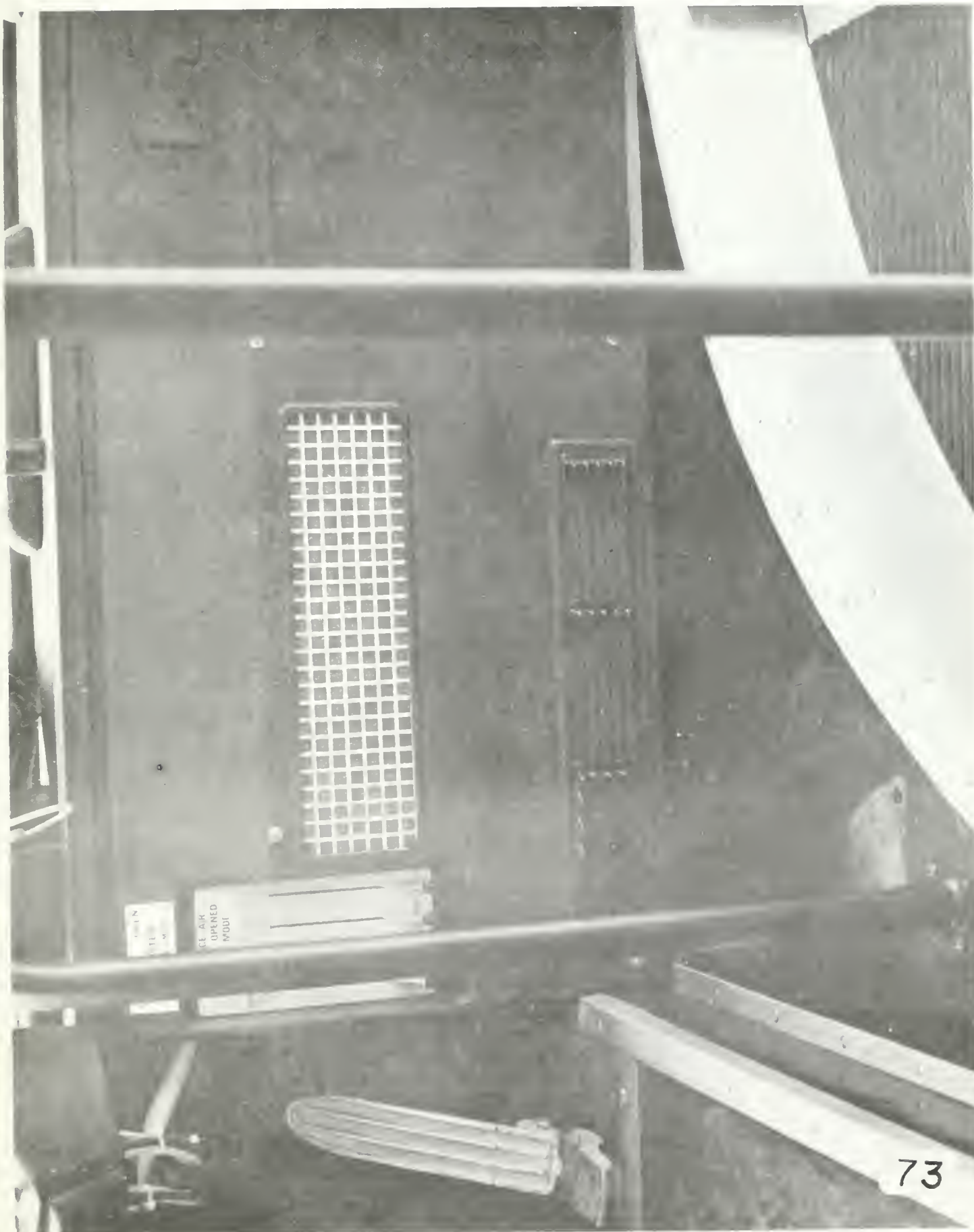
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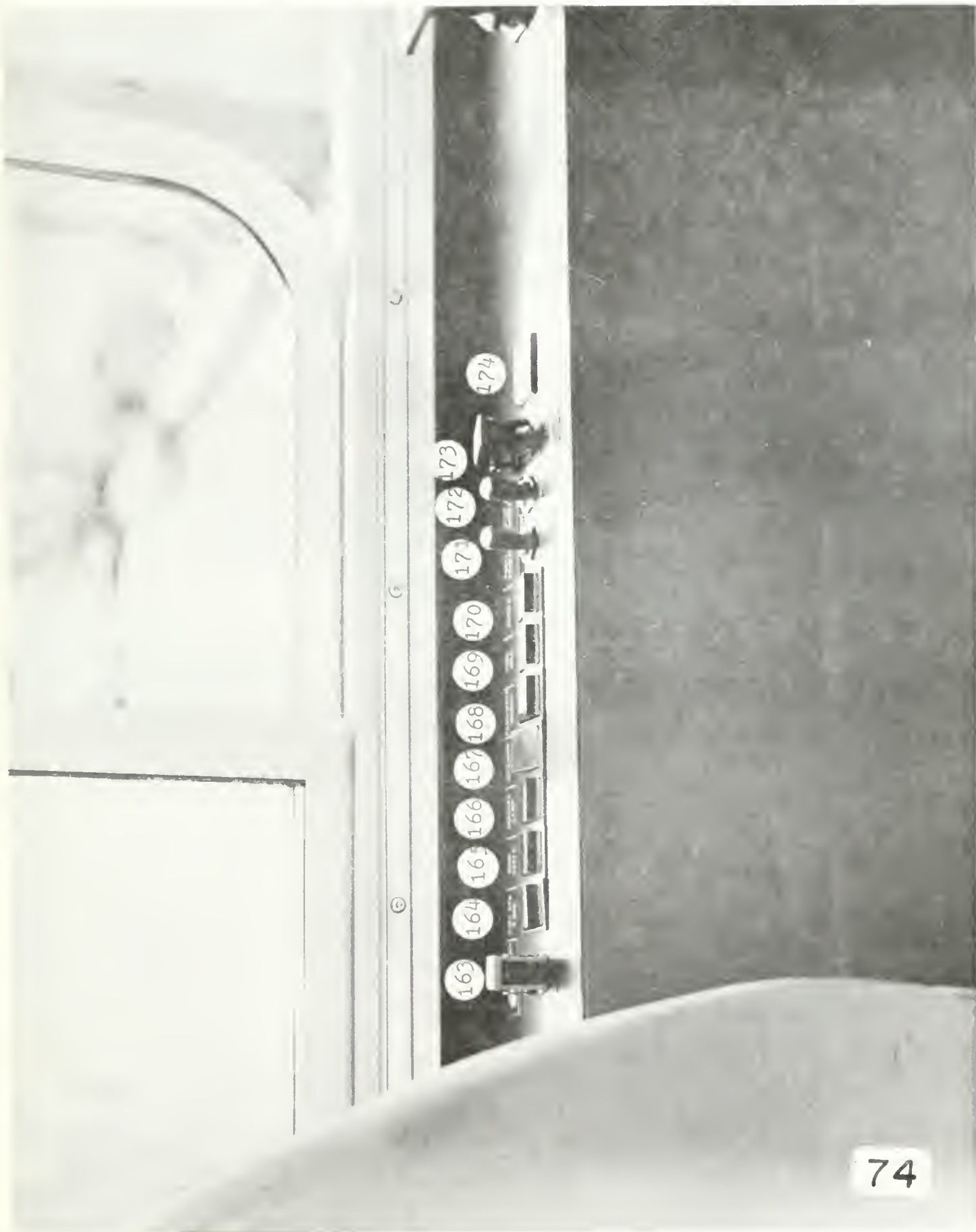




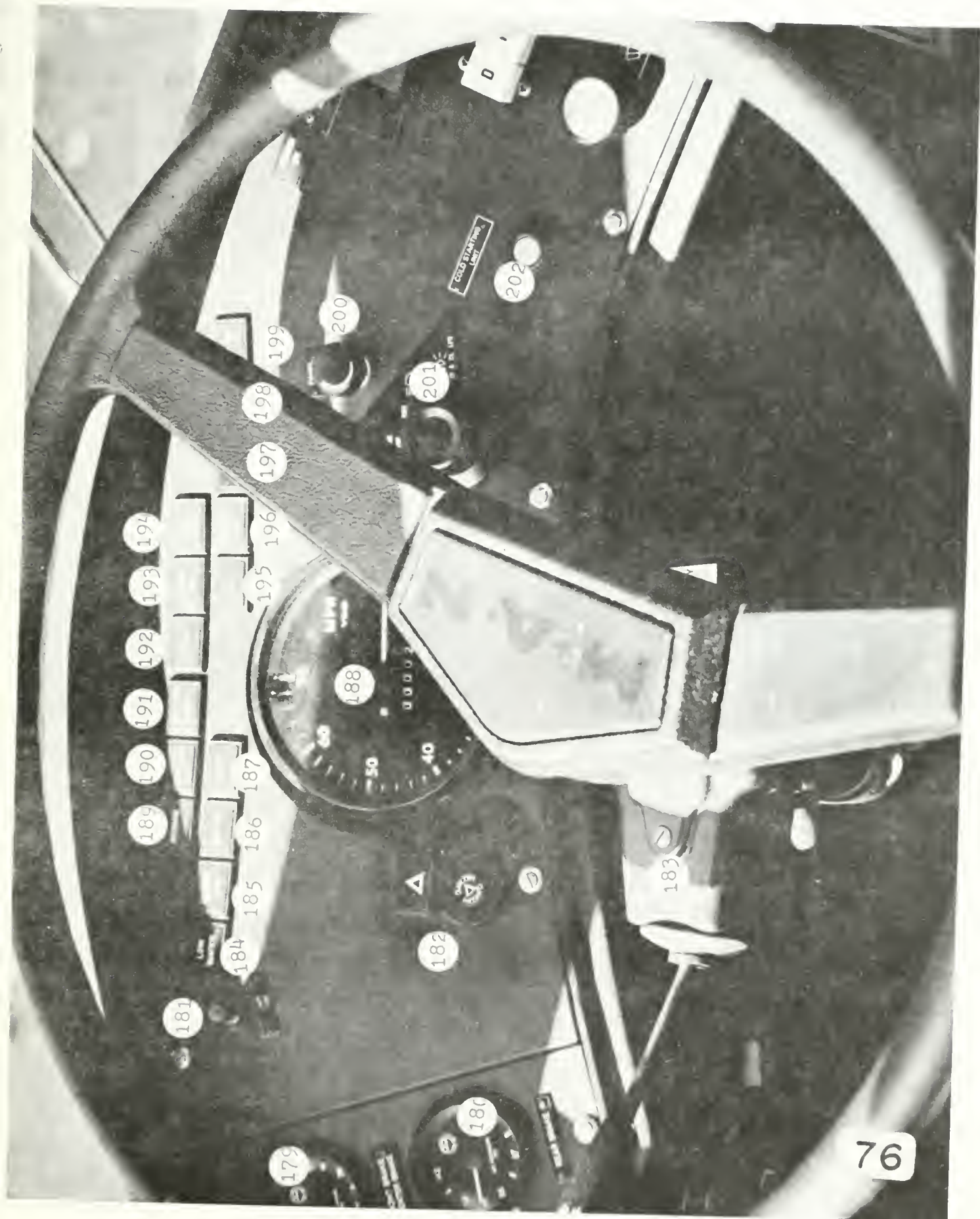


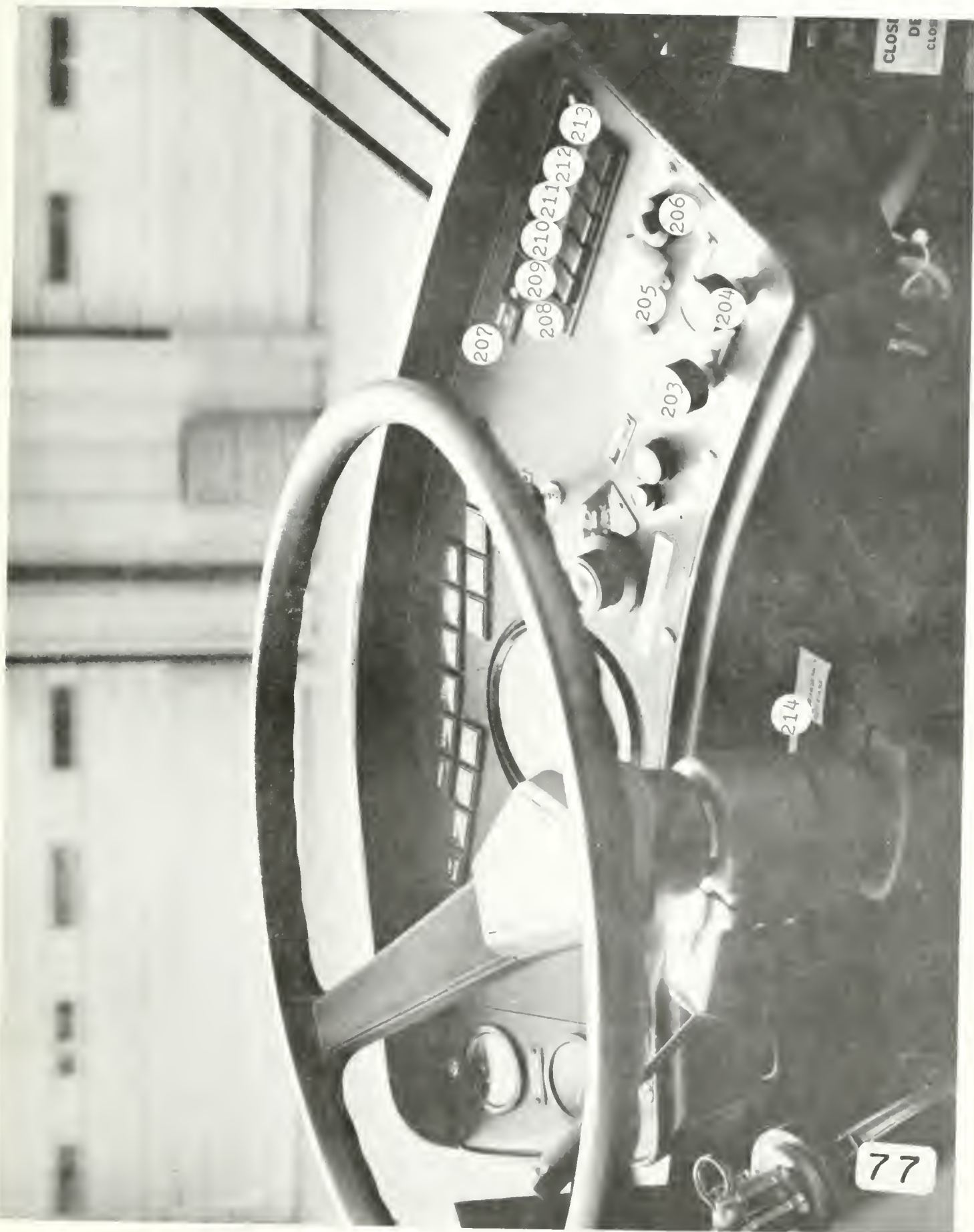












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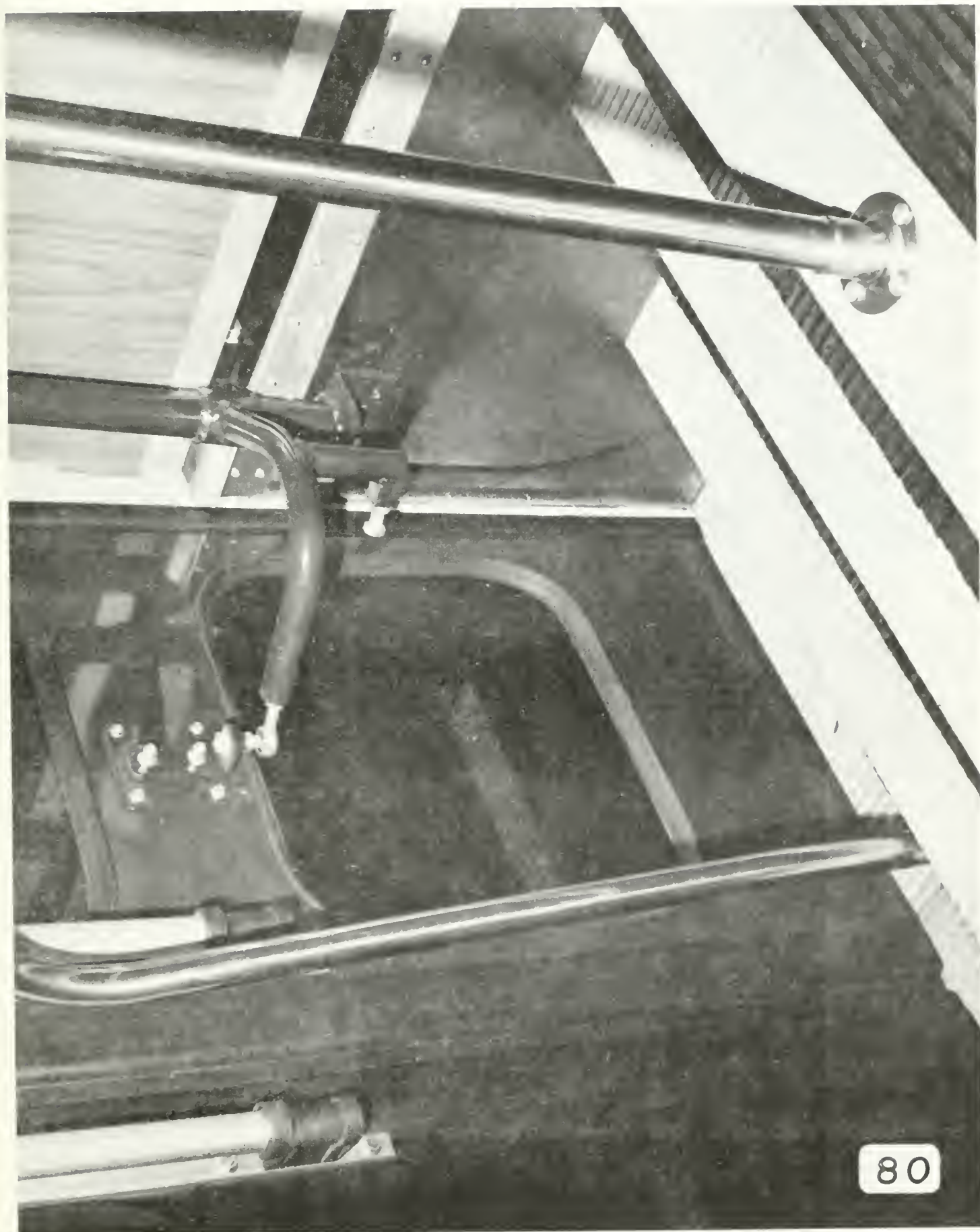
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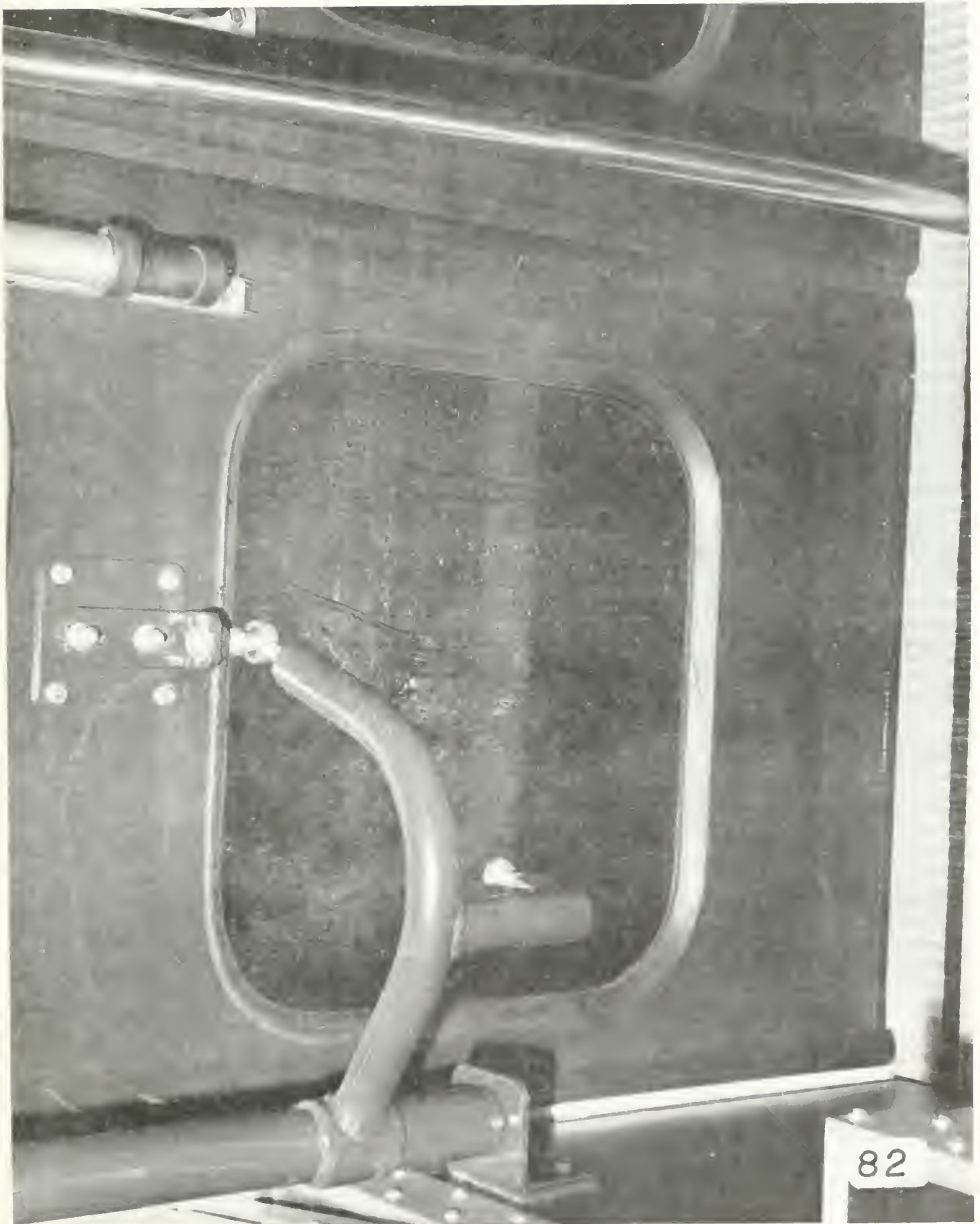
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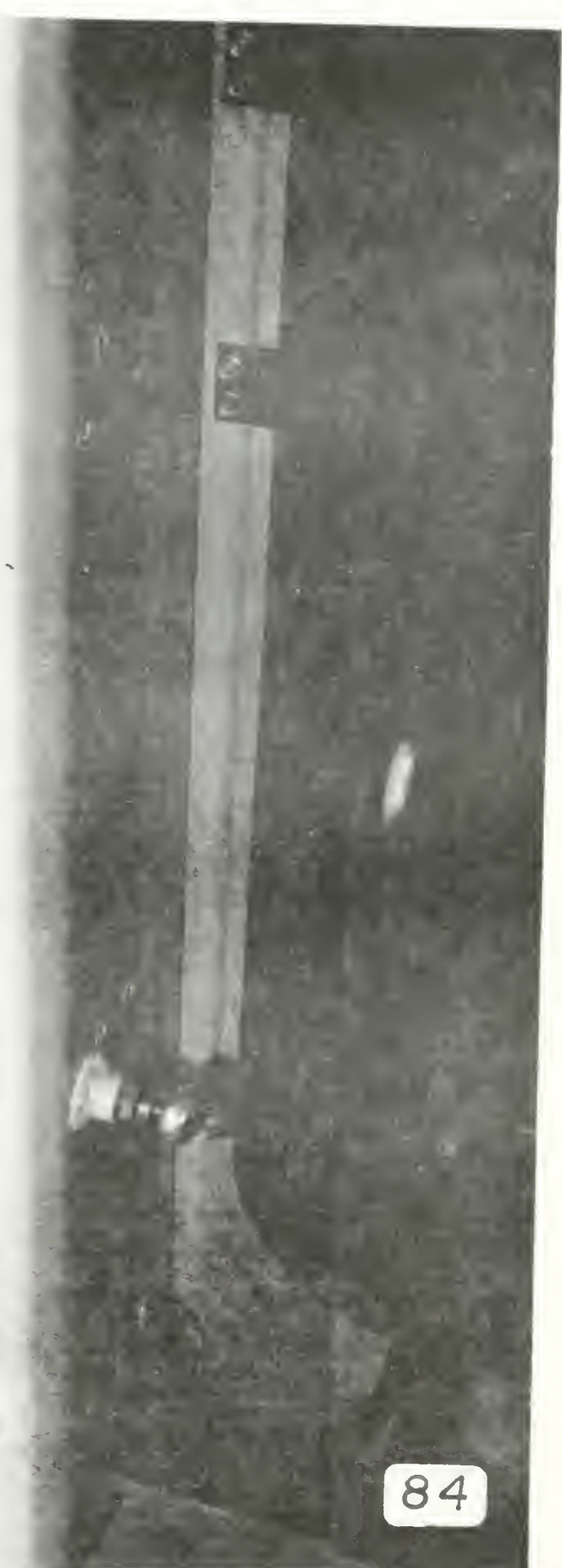
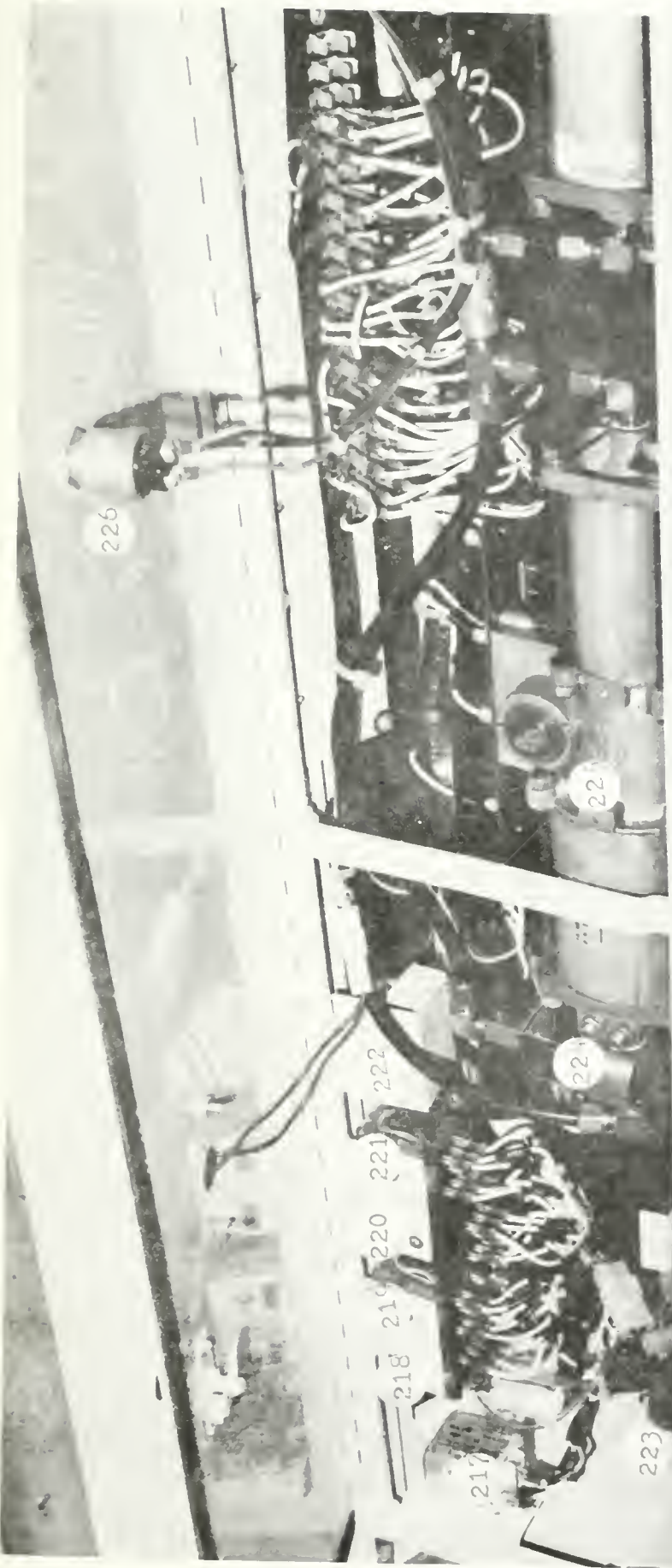


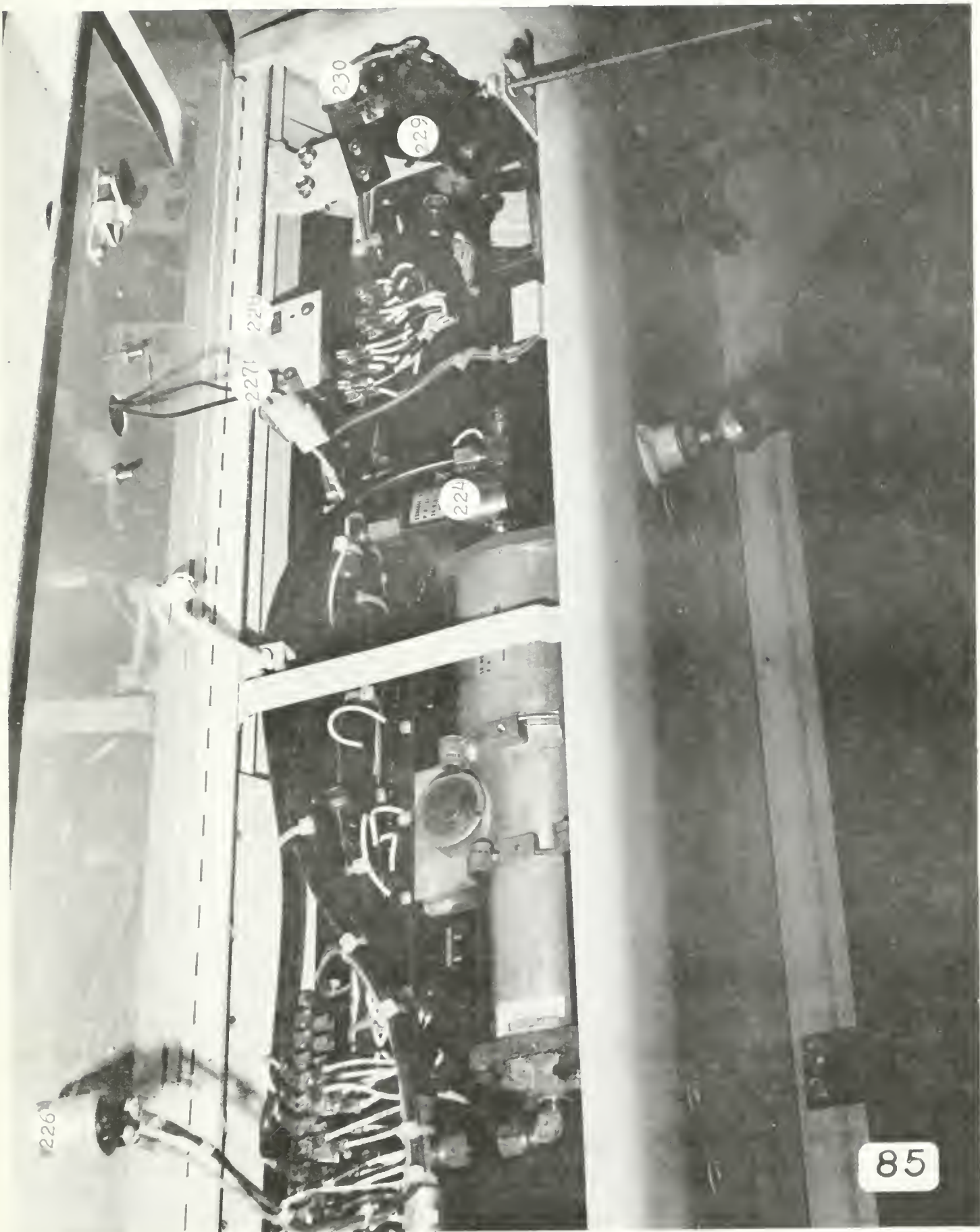




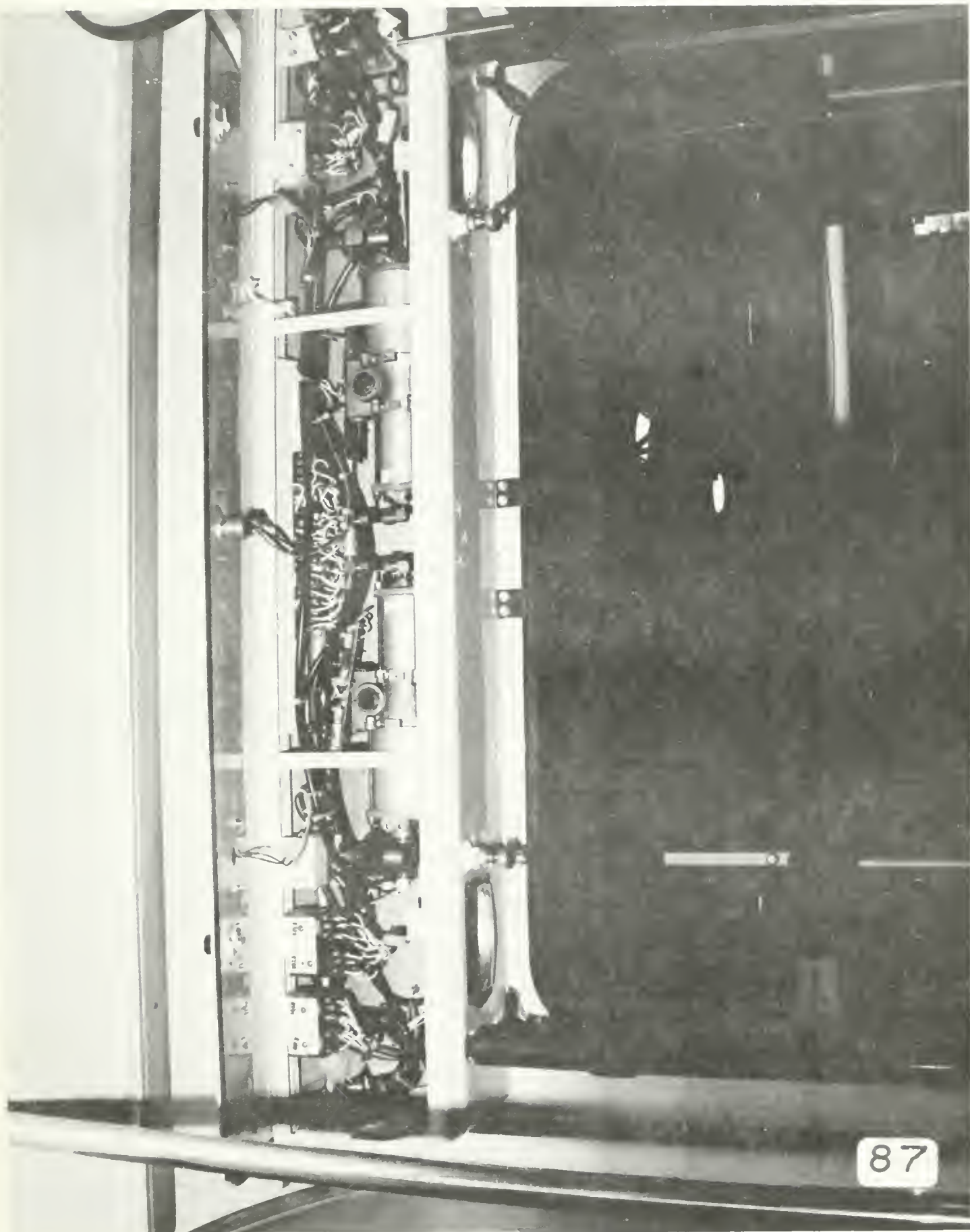


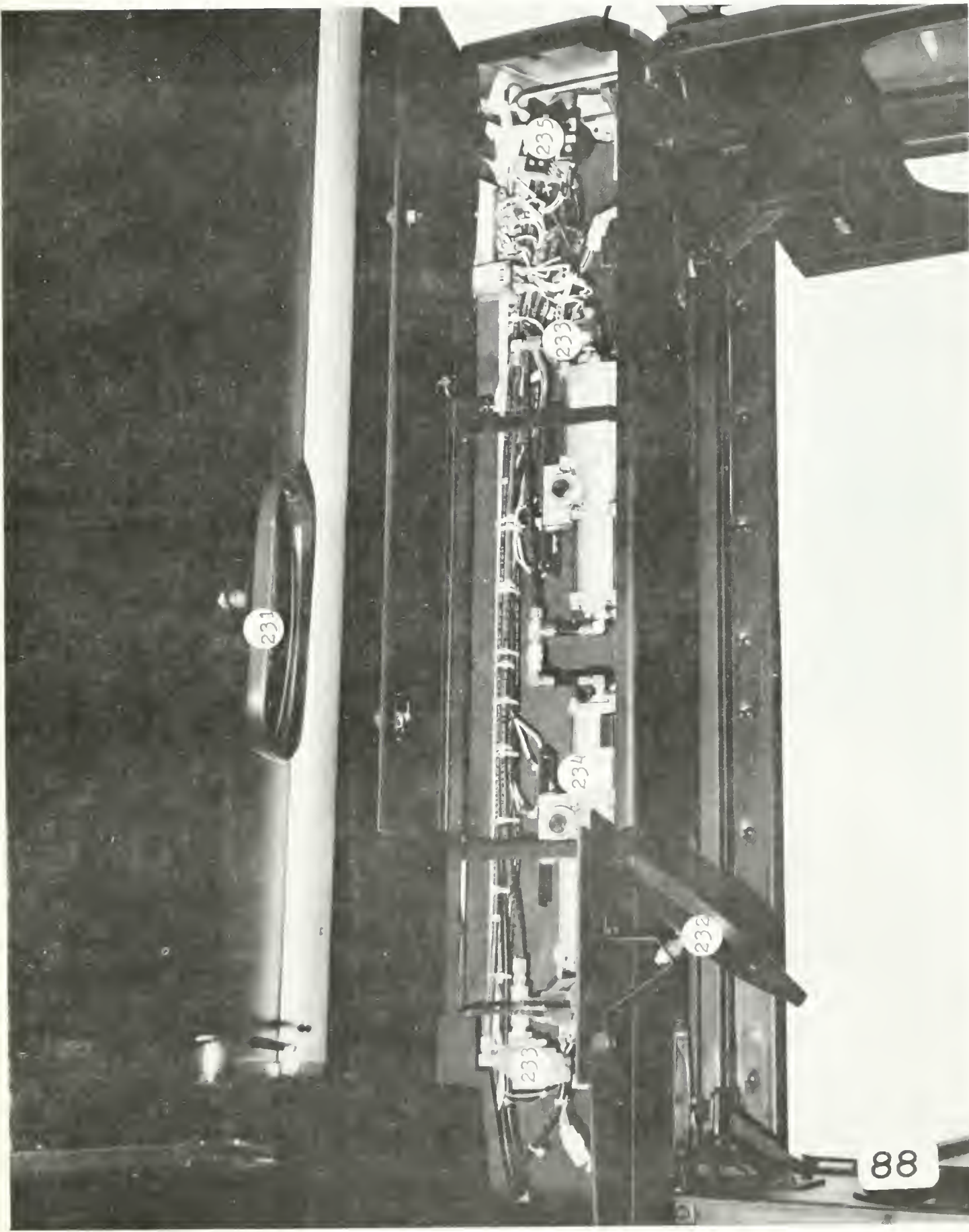


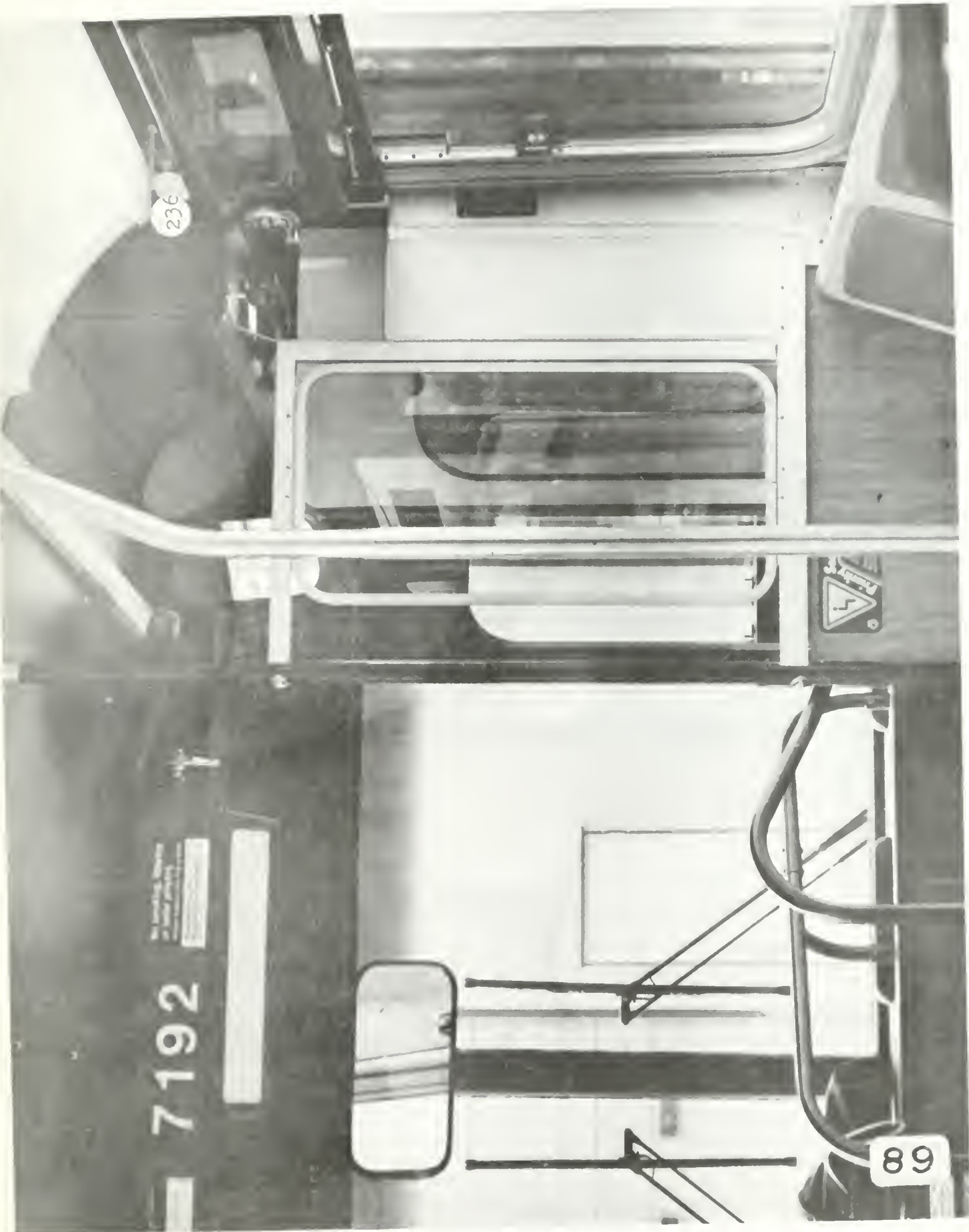


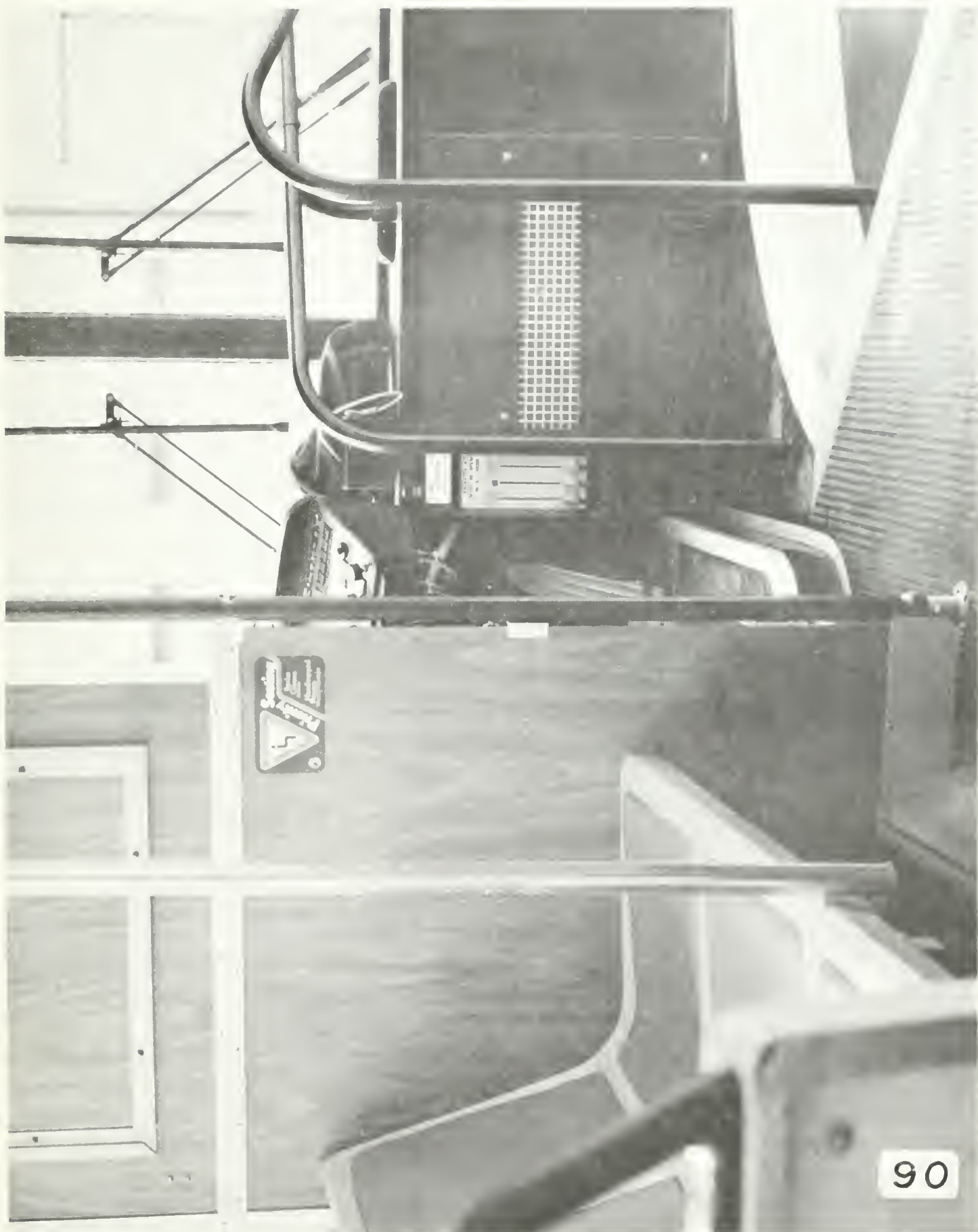


















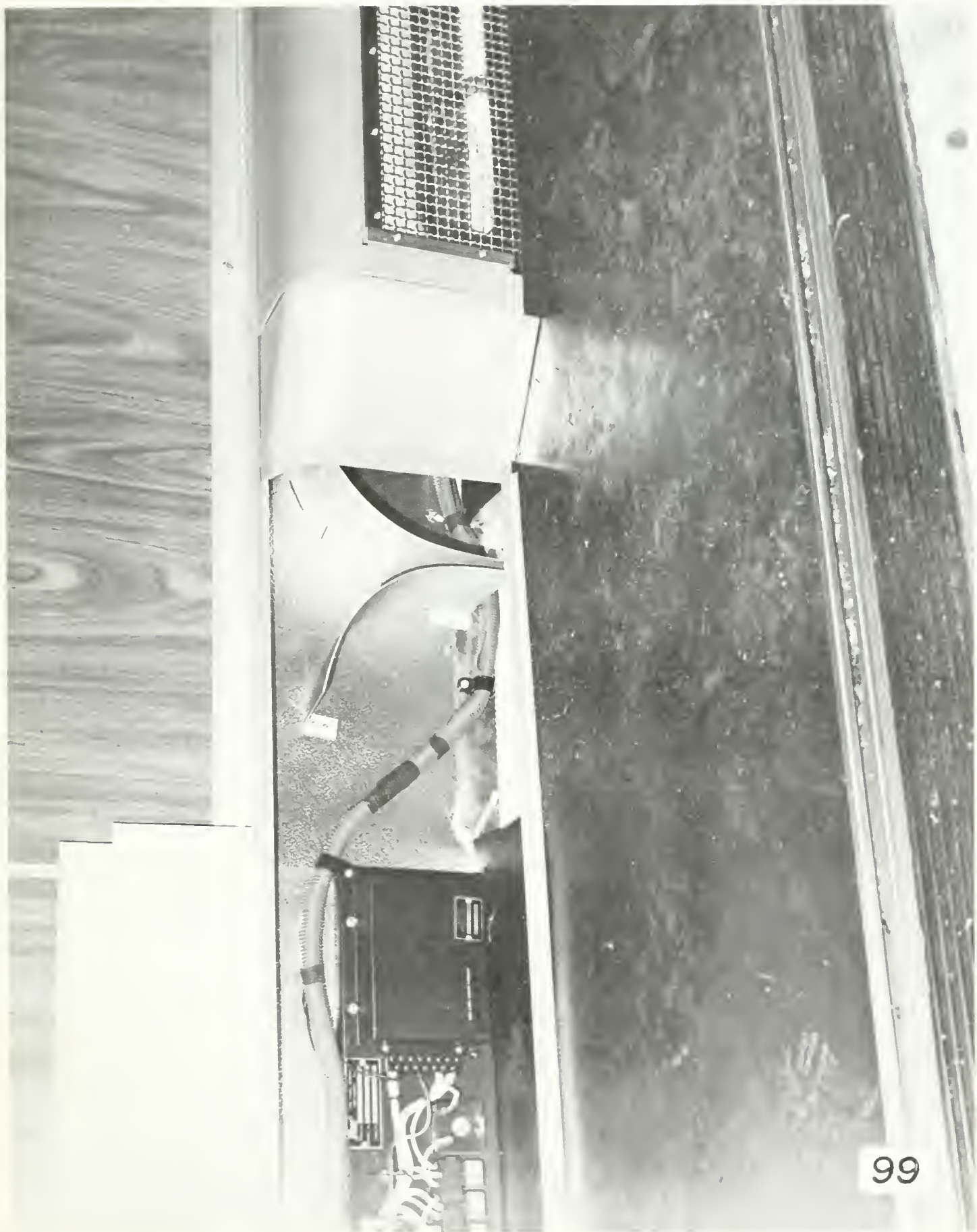


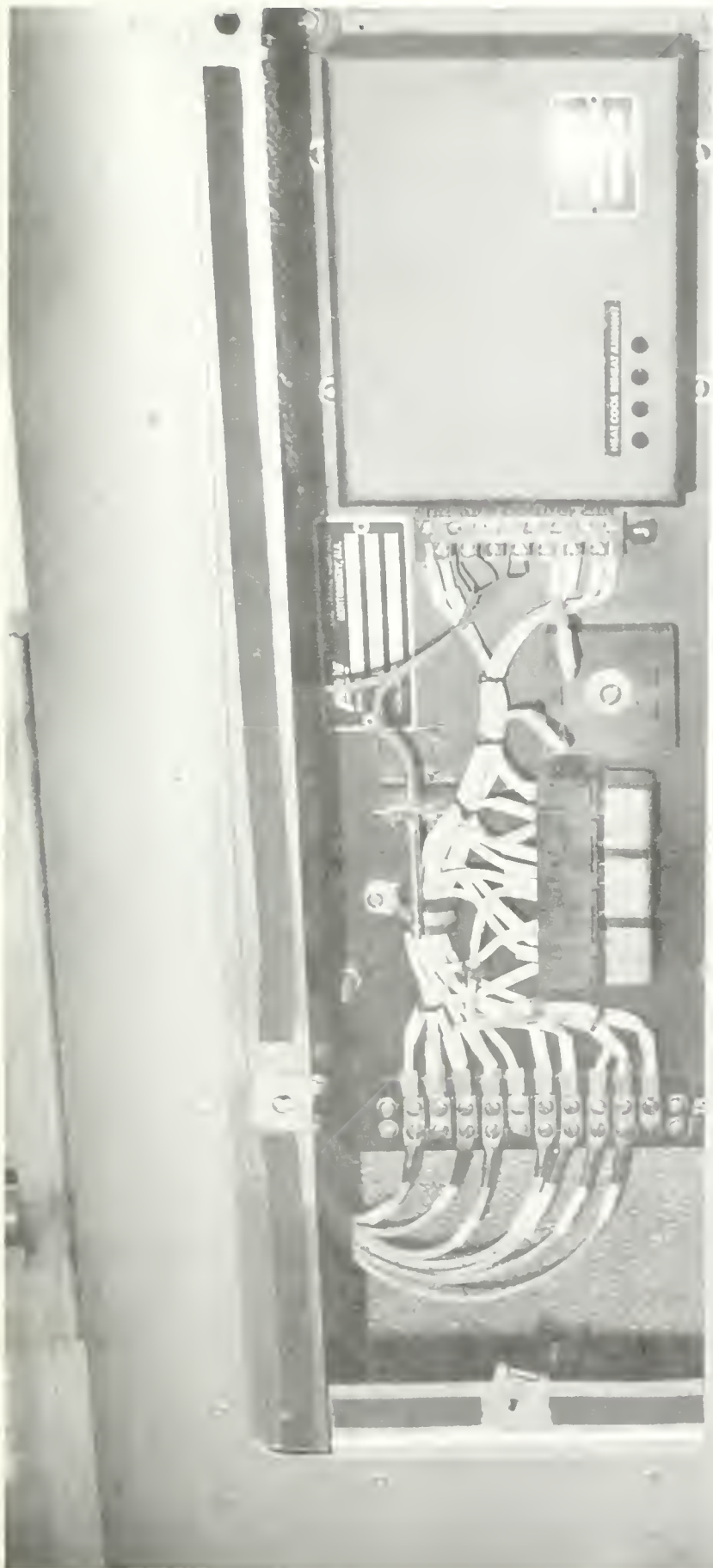




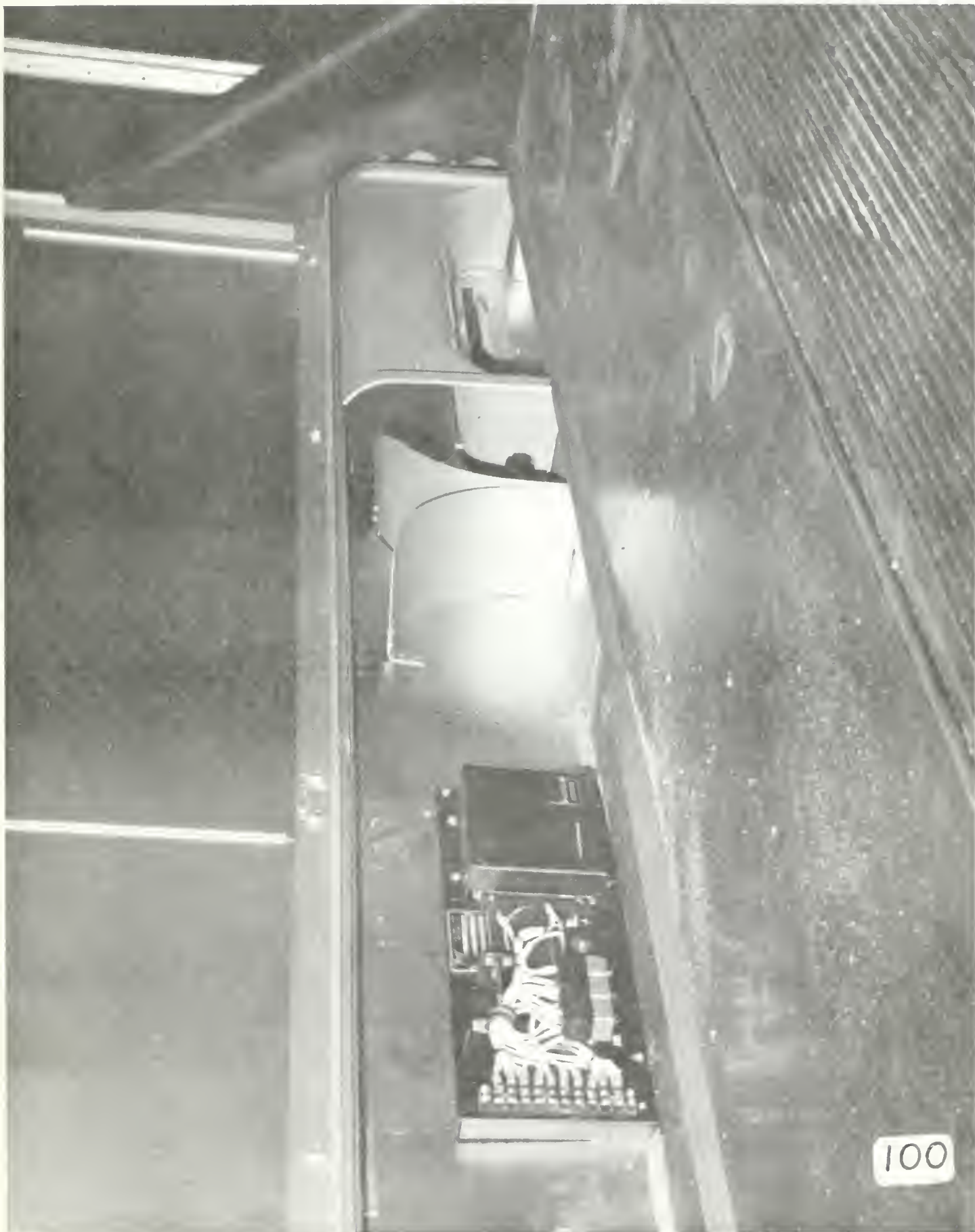


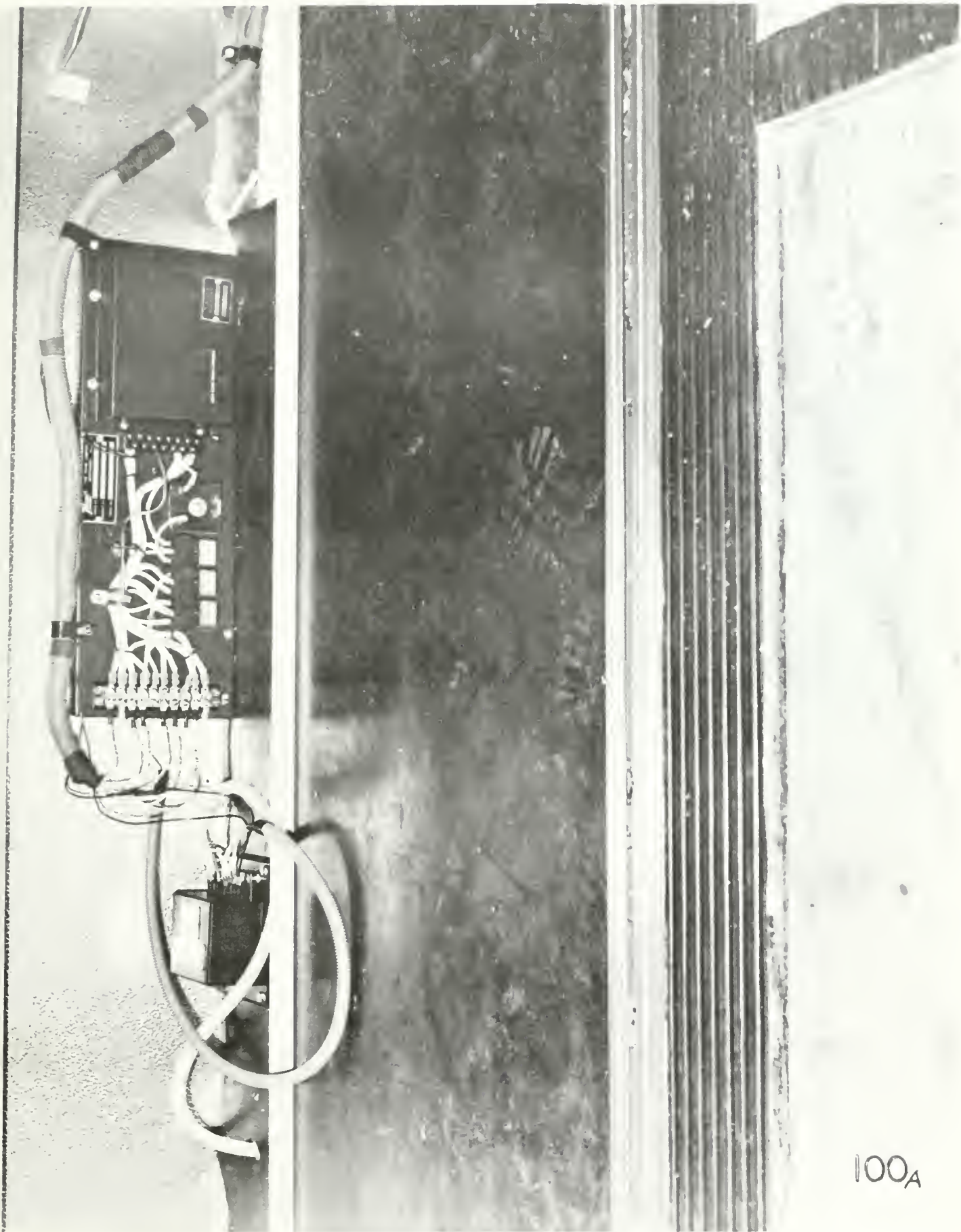






99A





100A





101A



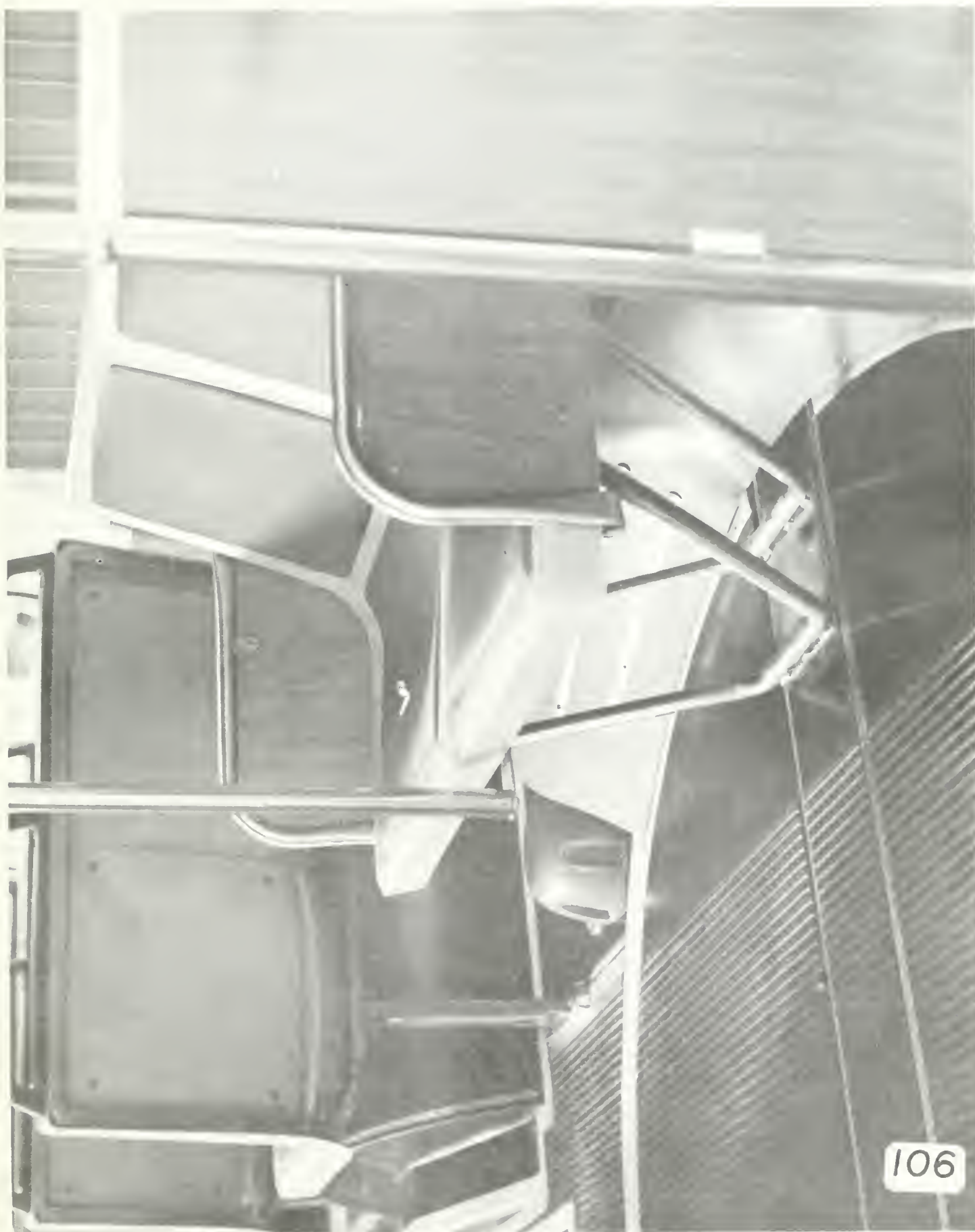
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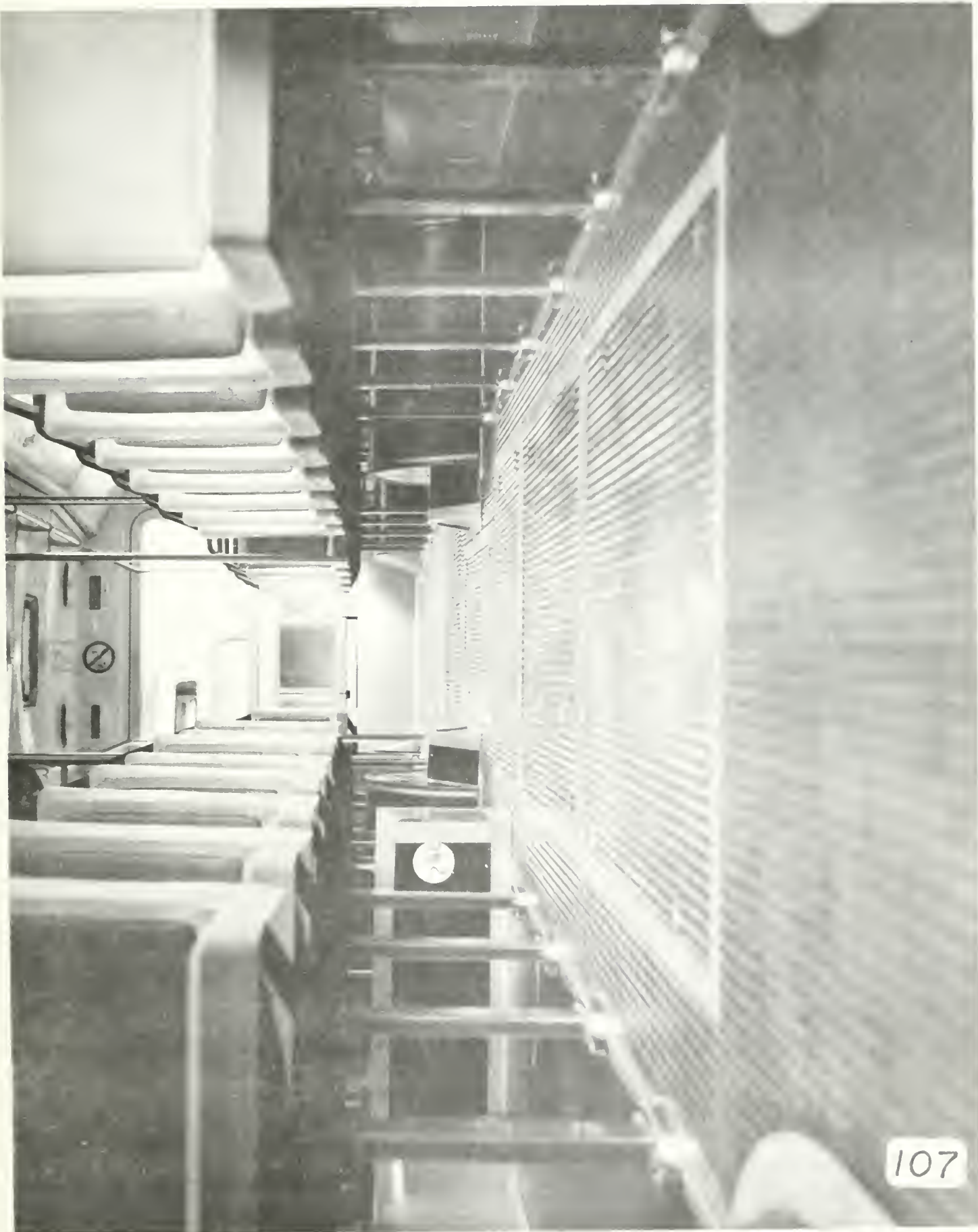




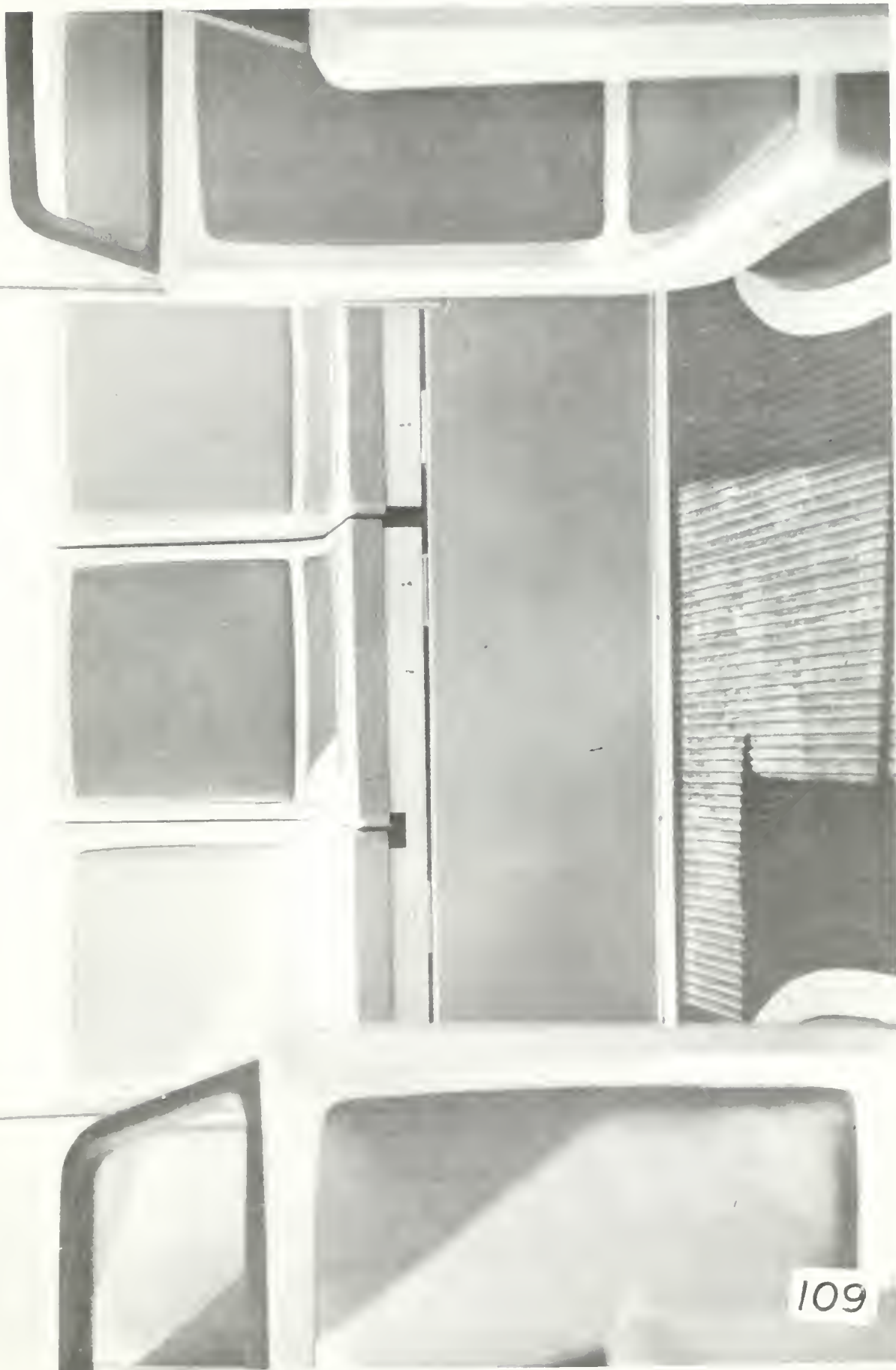


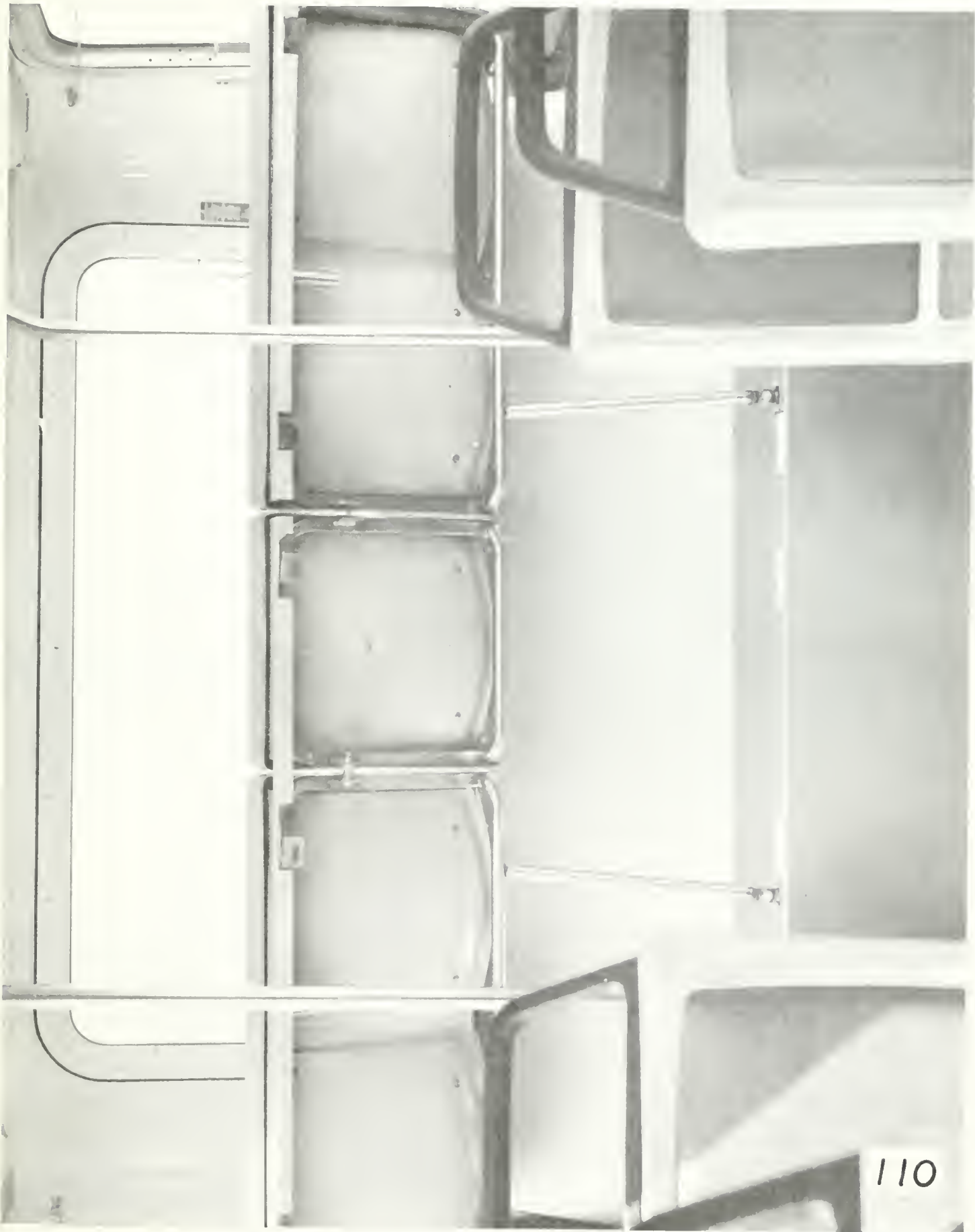






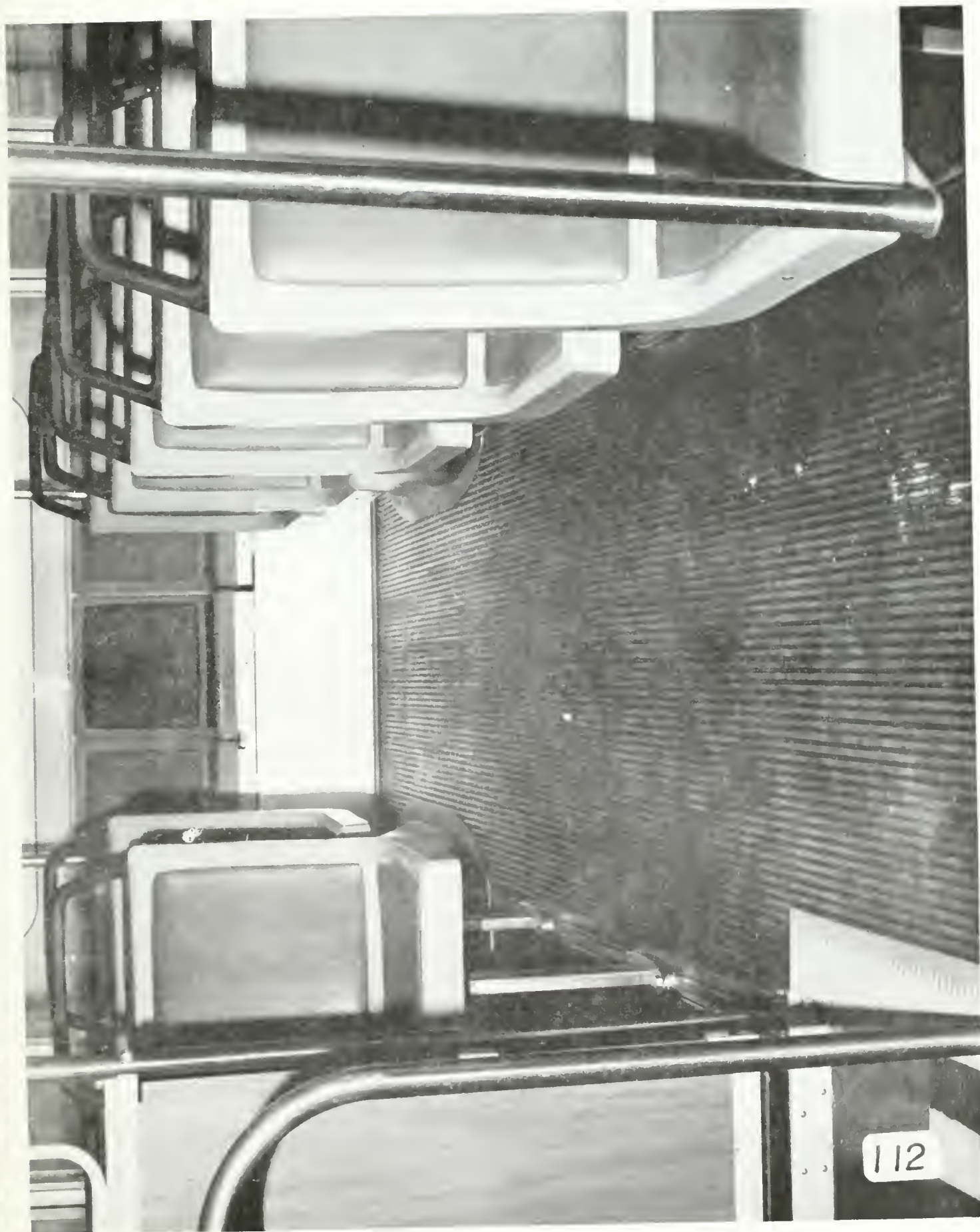








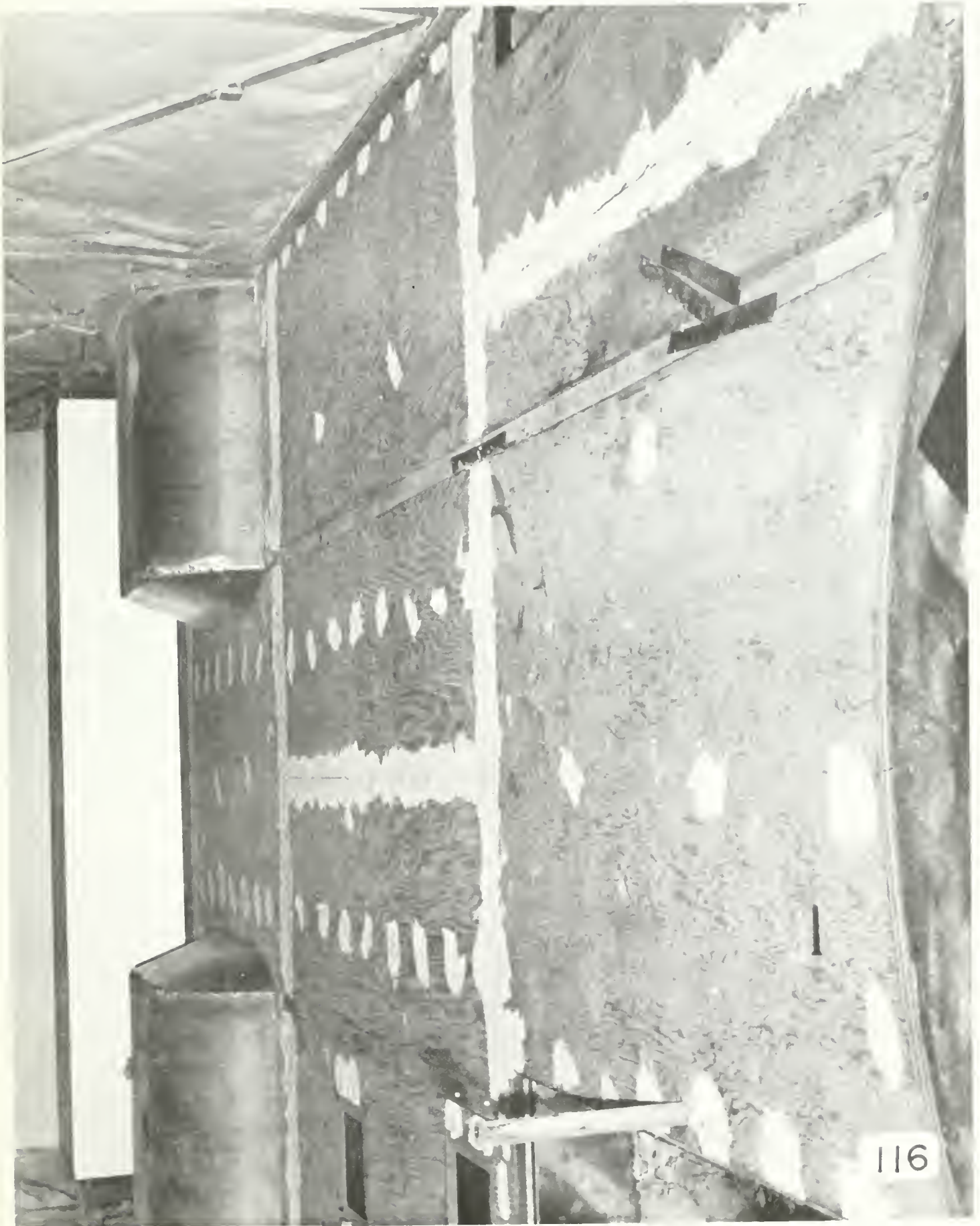
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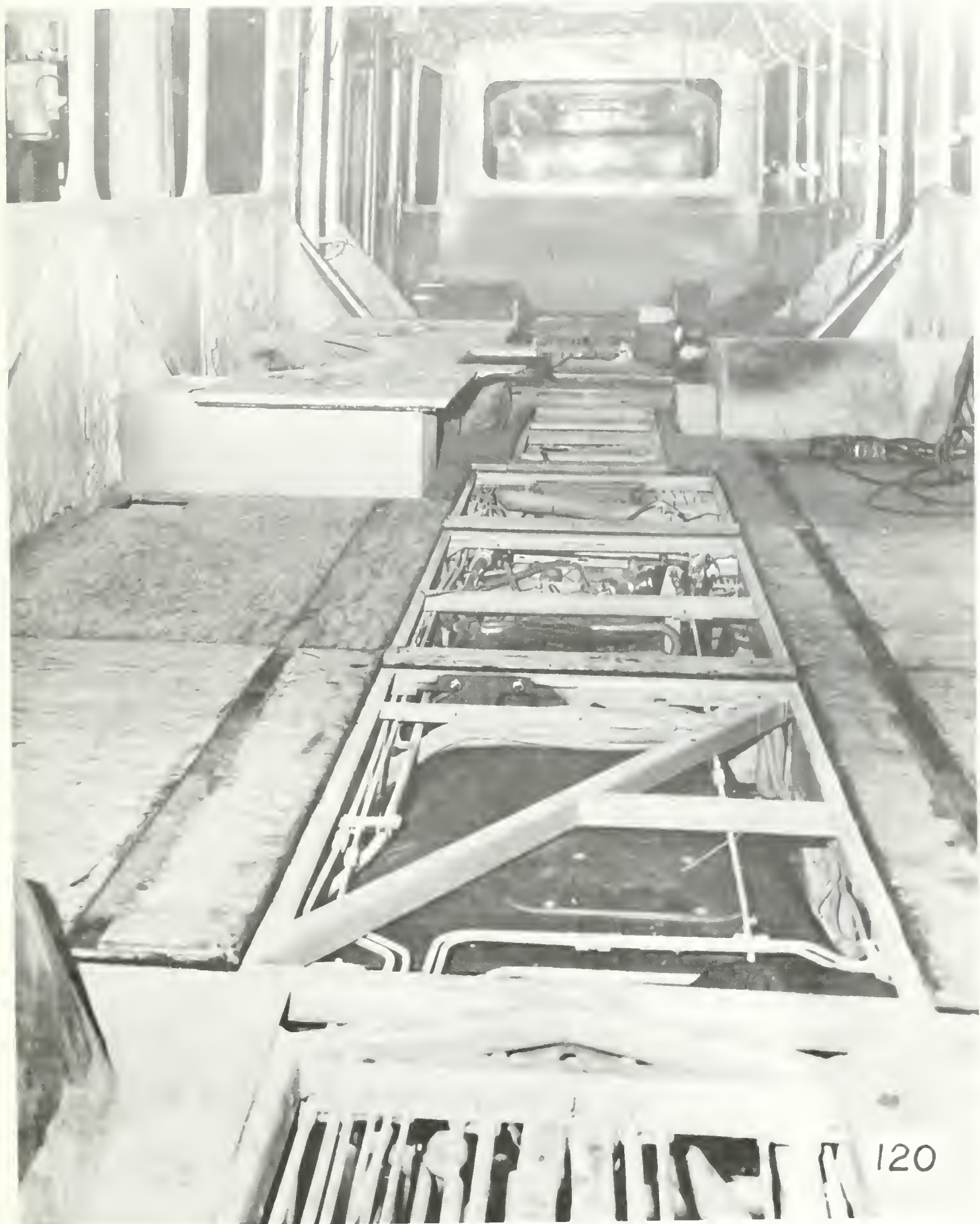


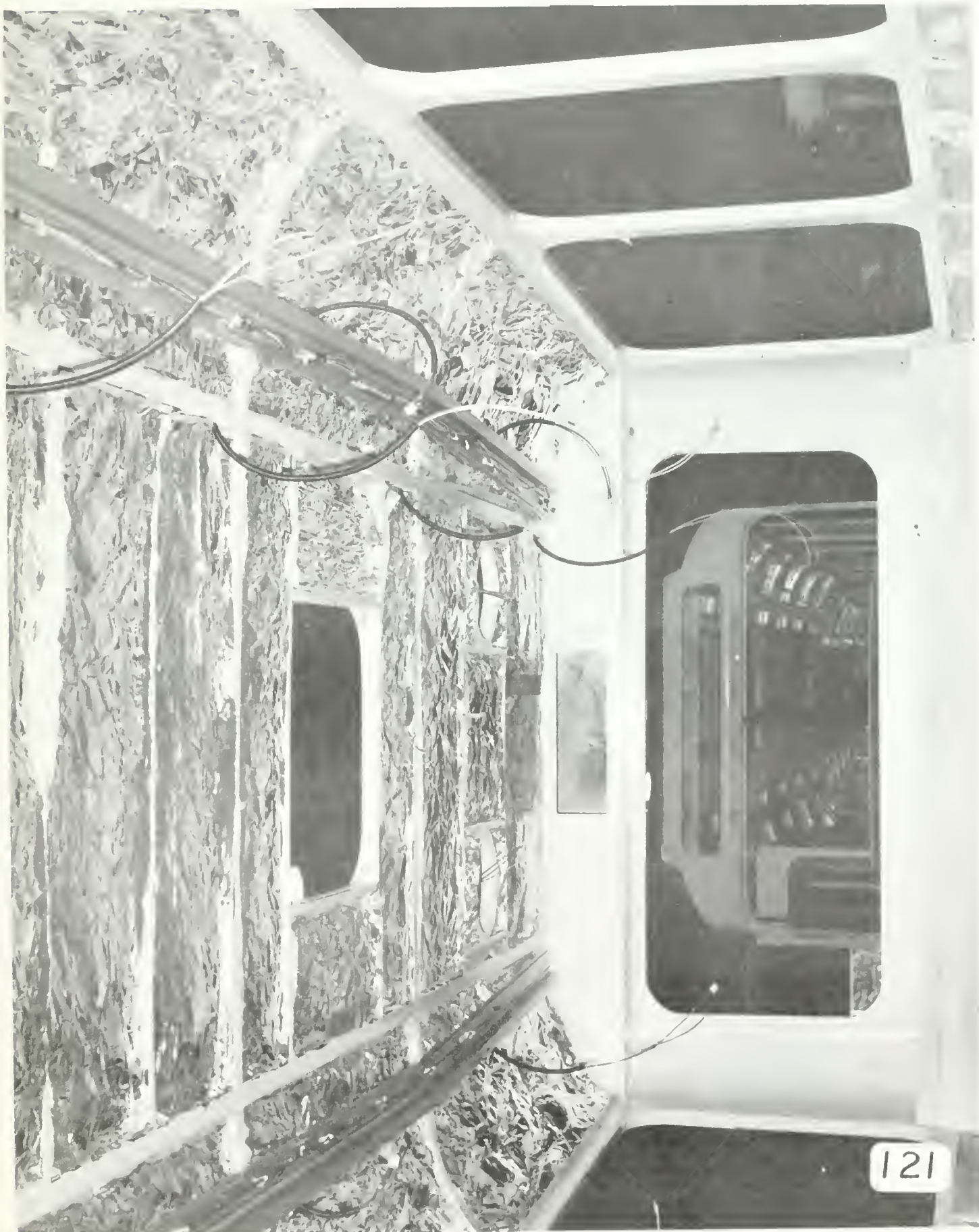
















123



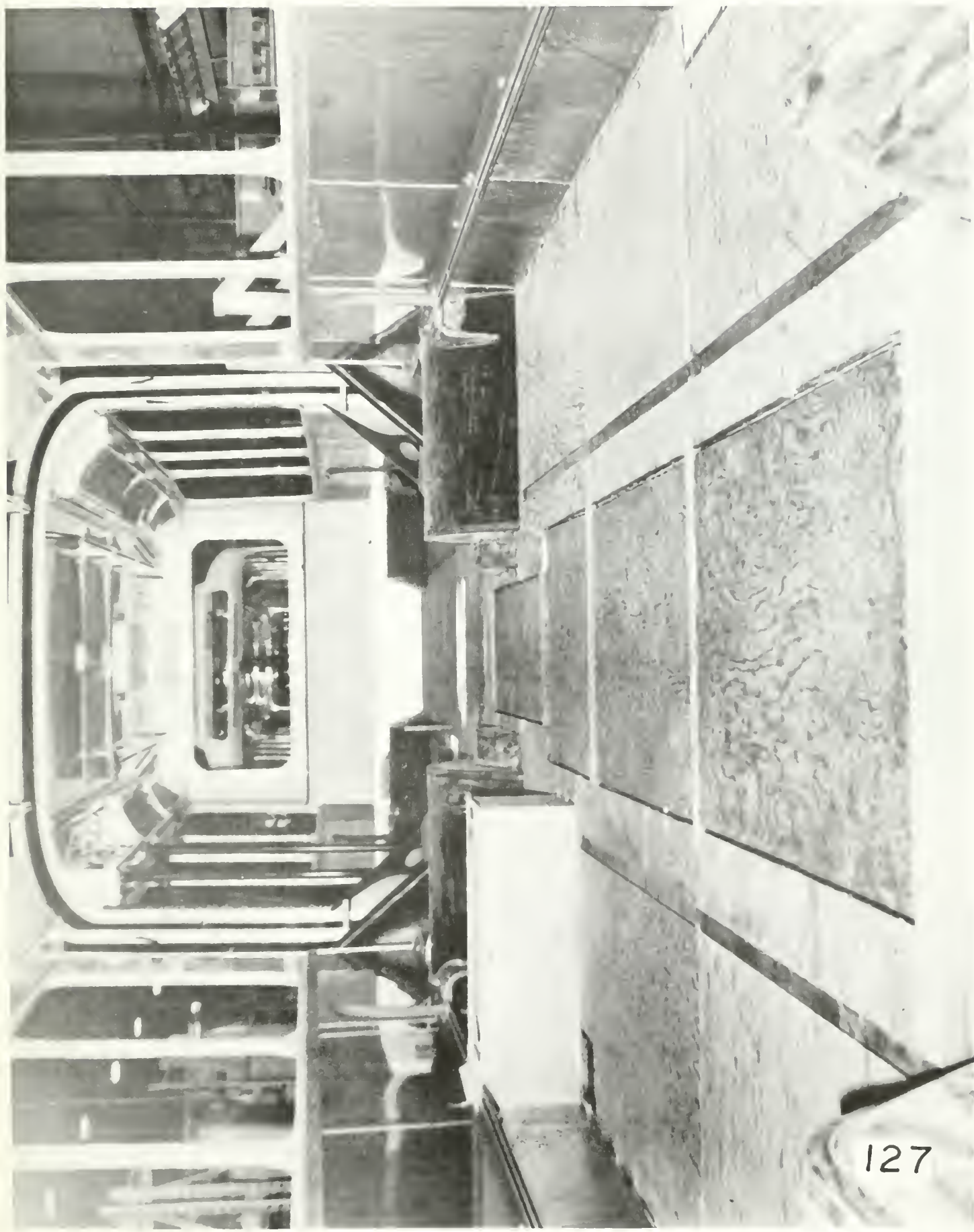




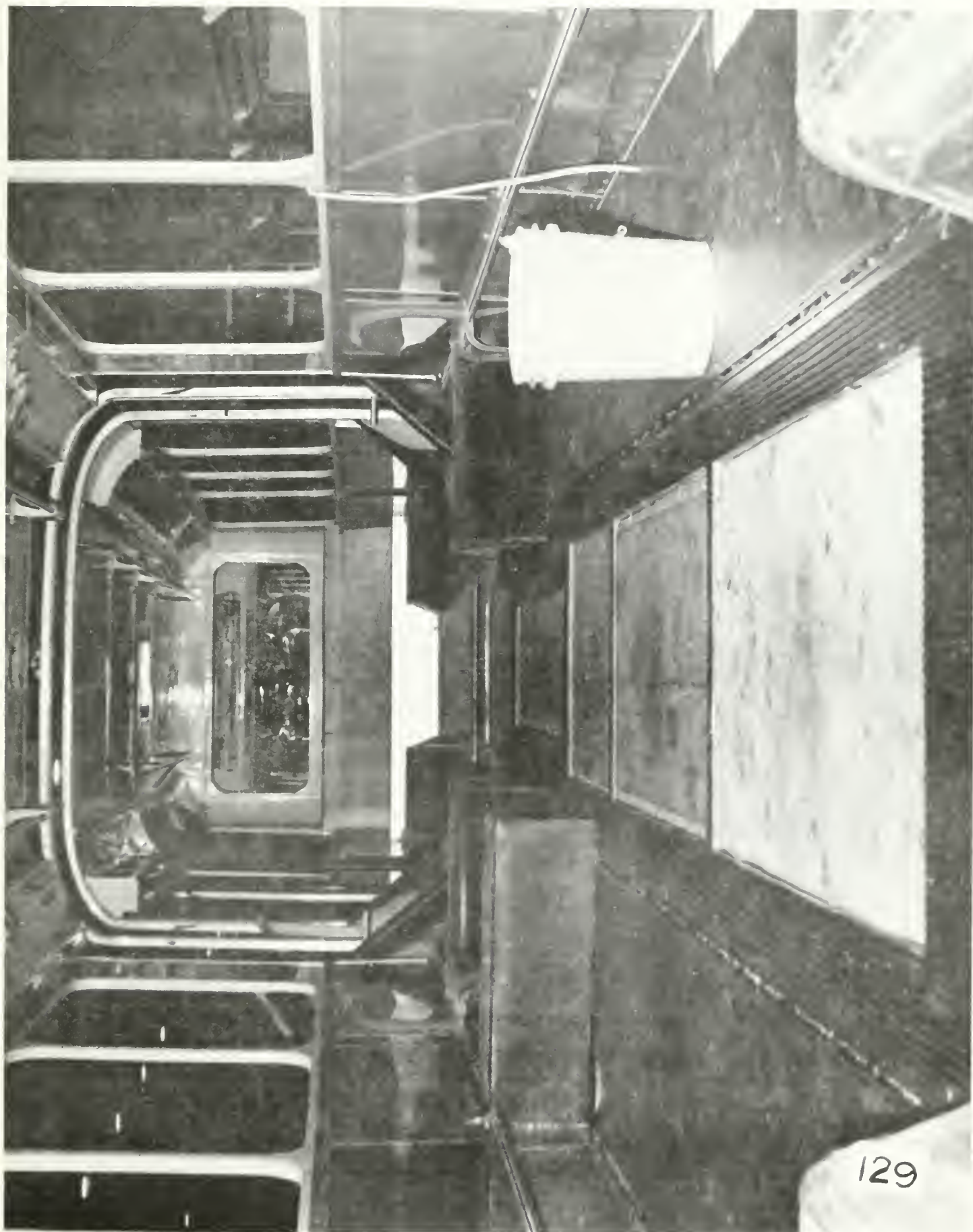


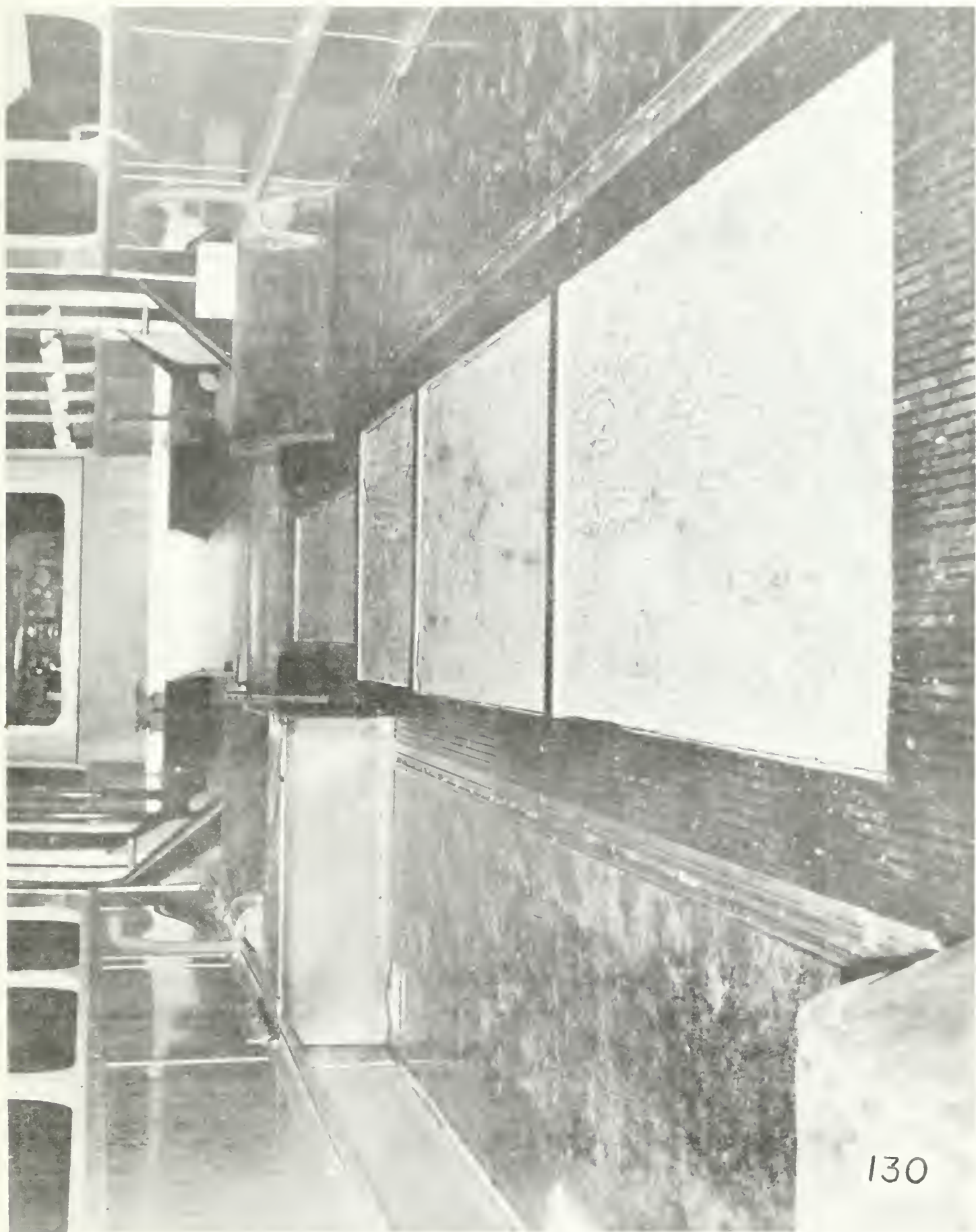
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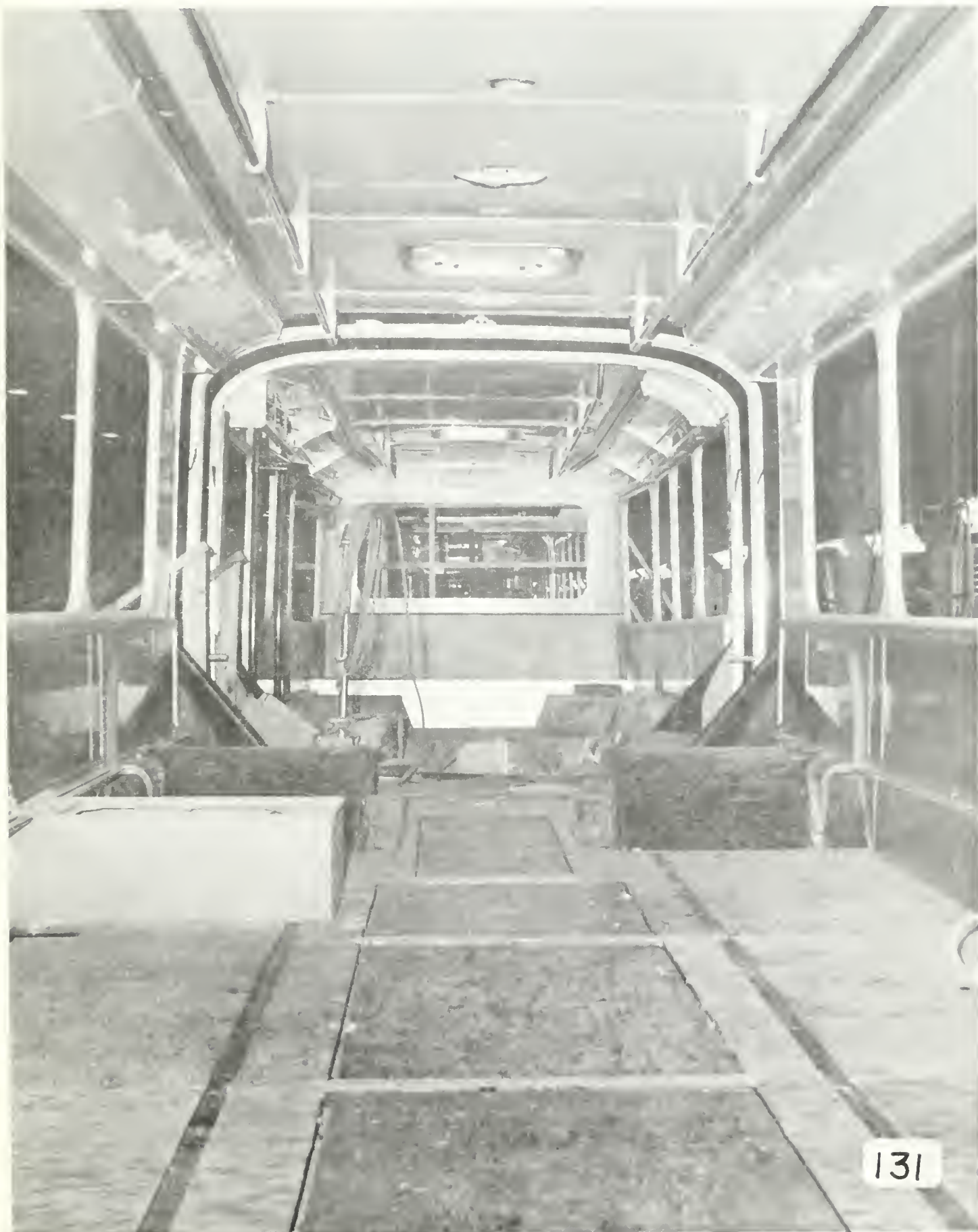
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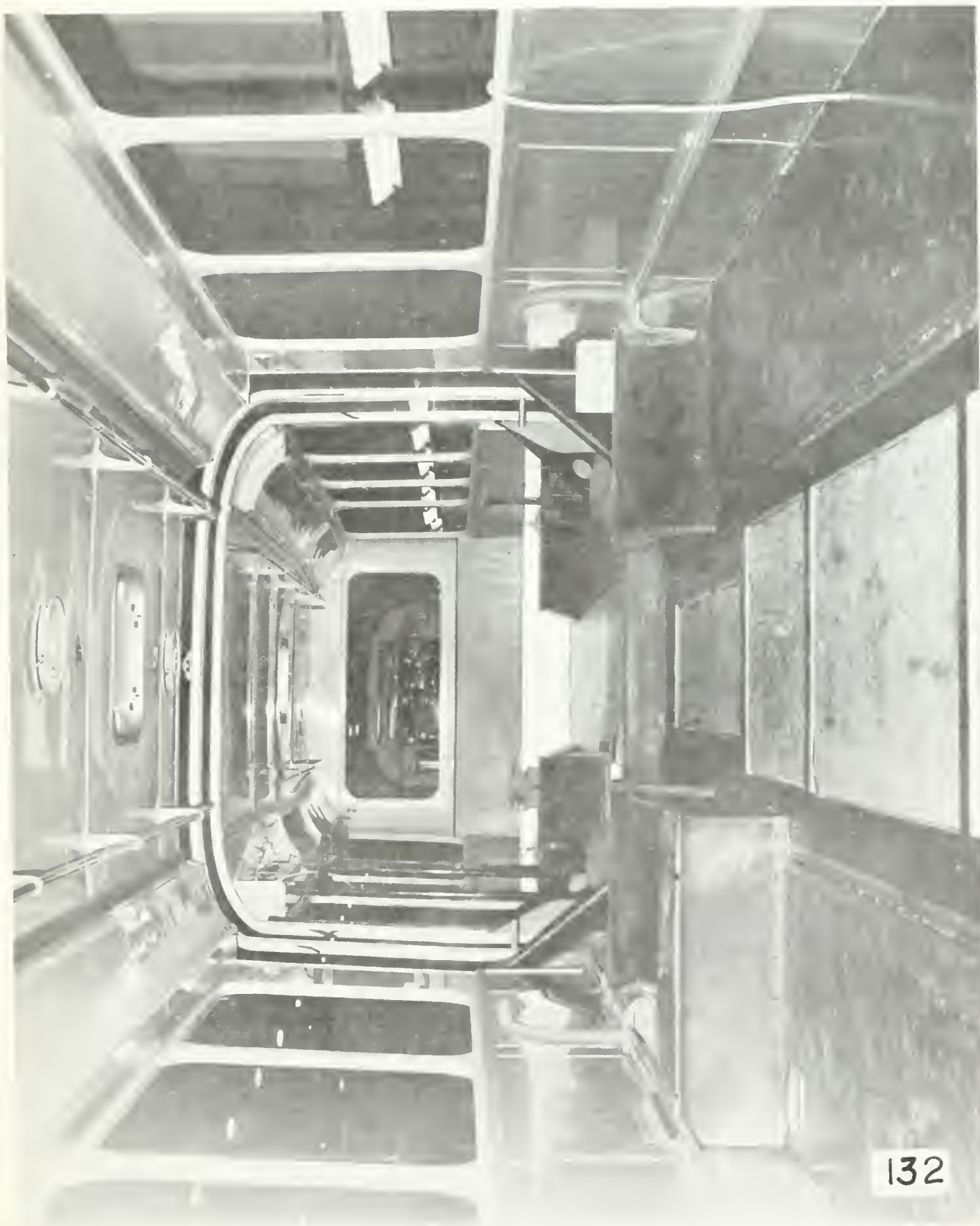


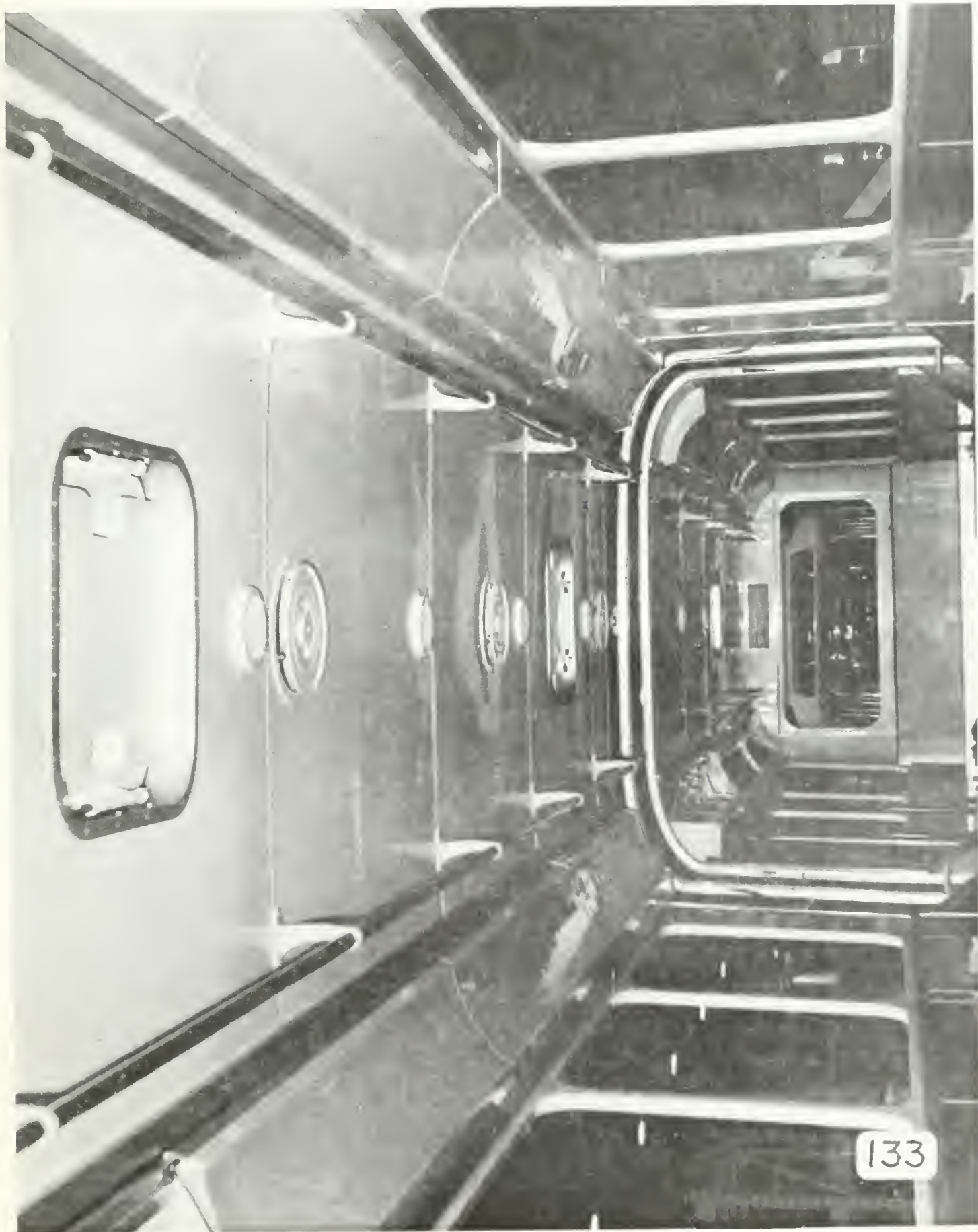


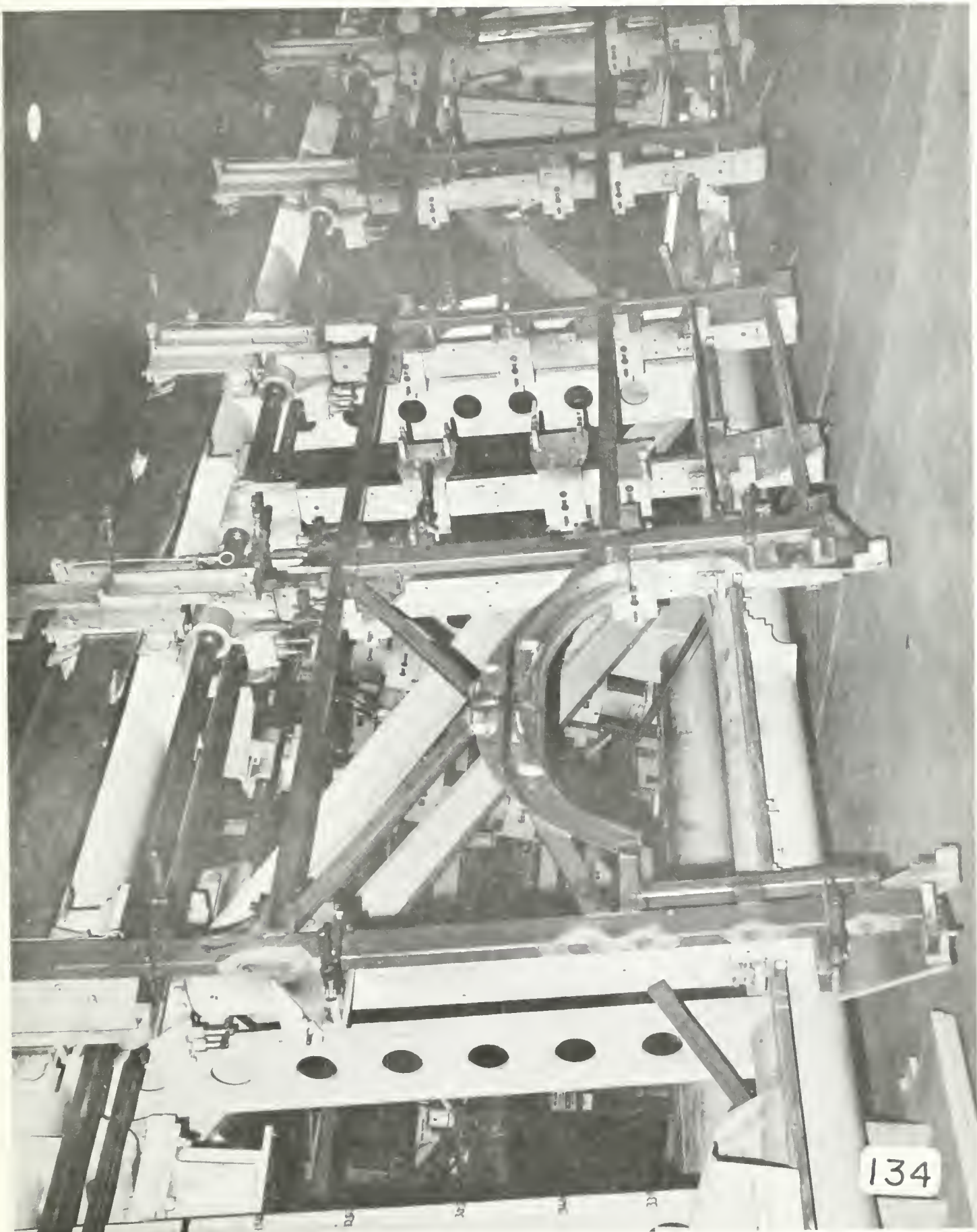


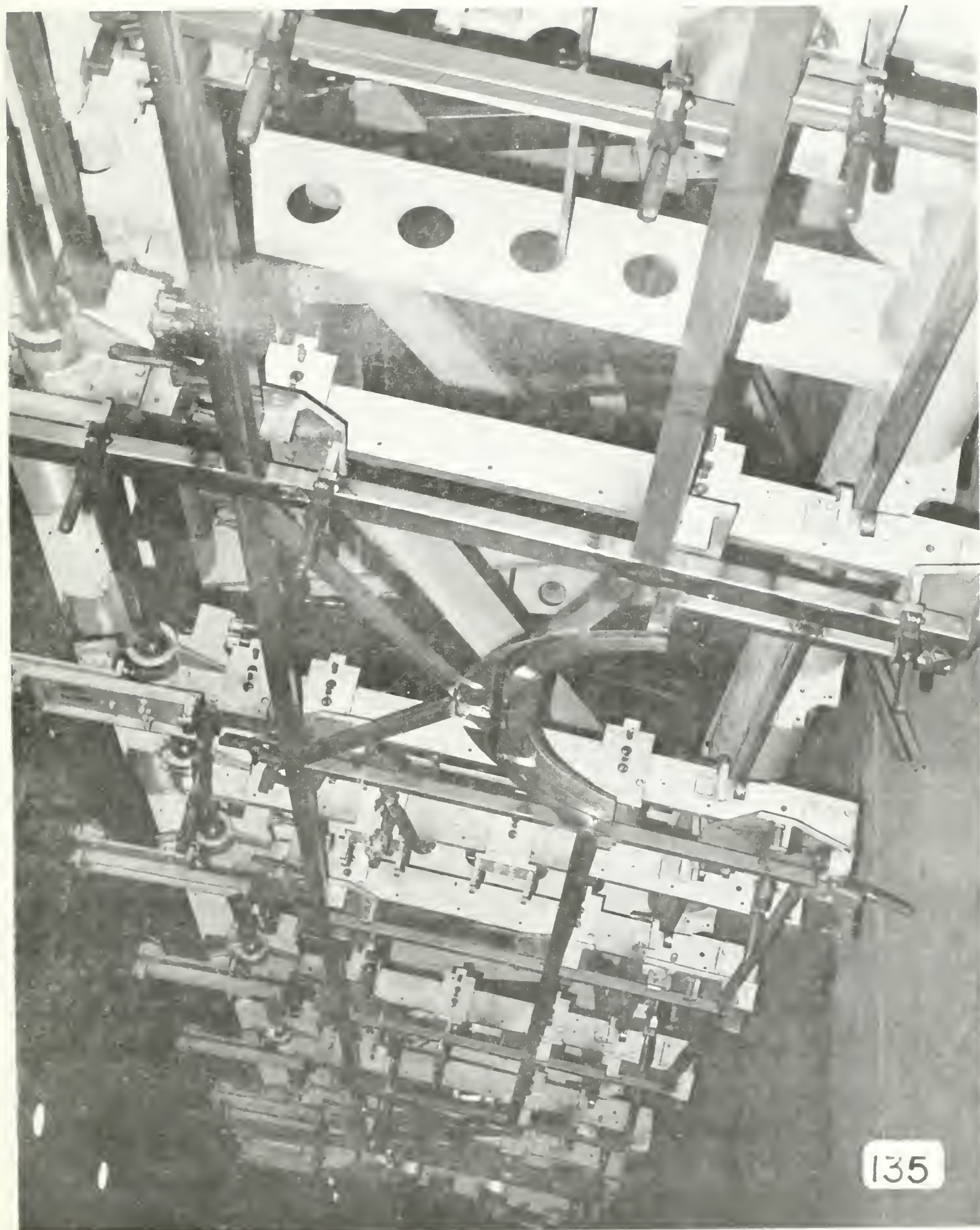


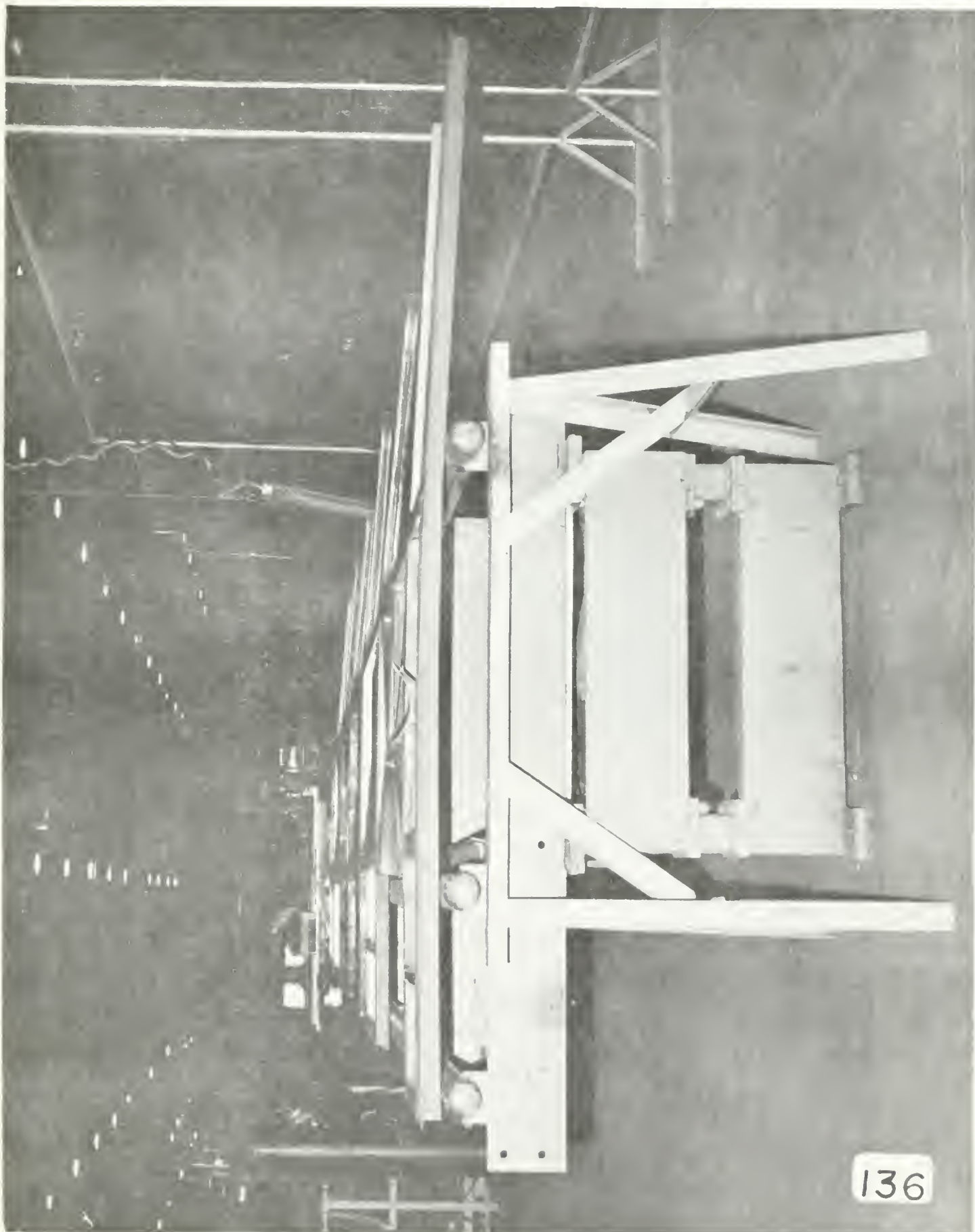


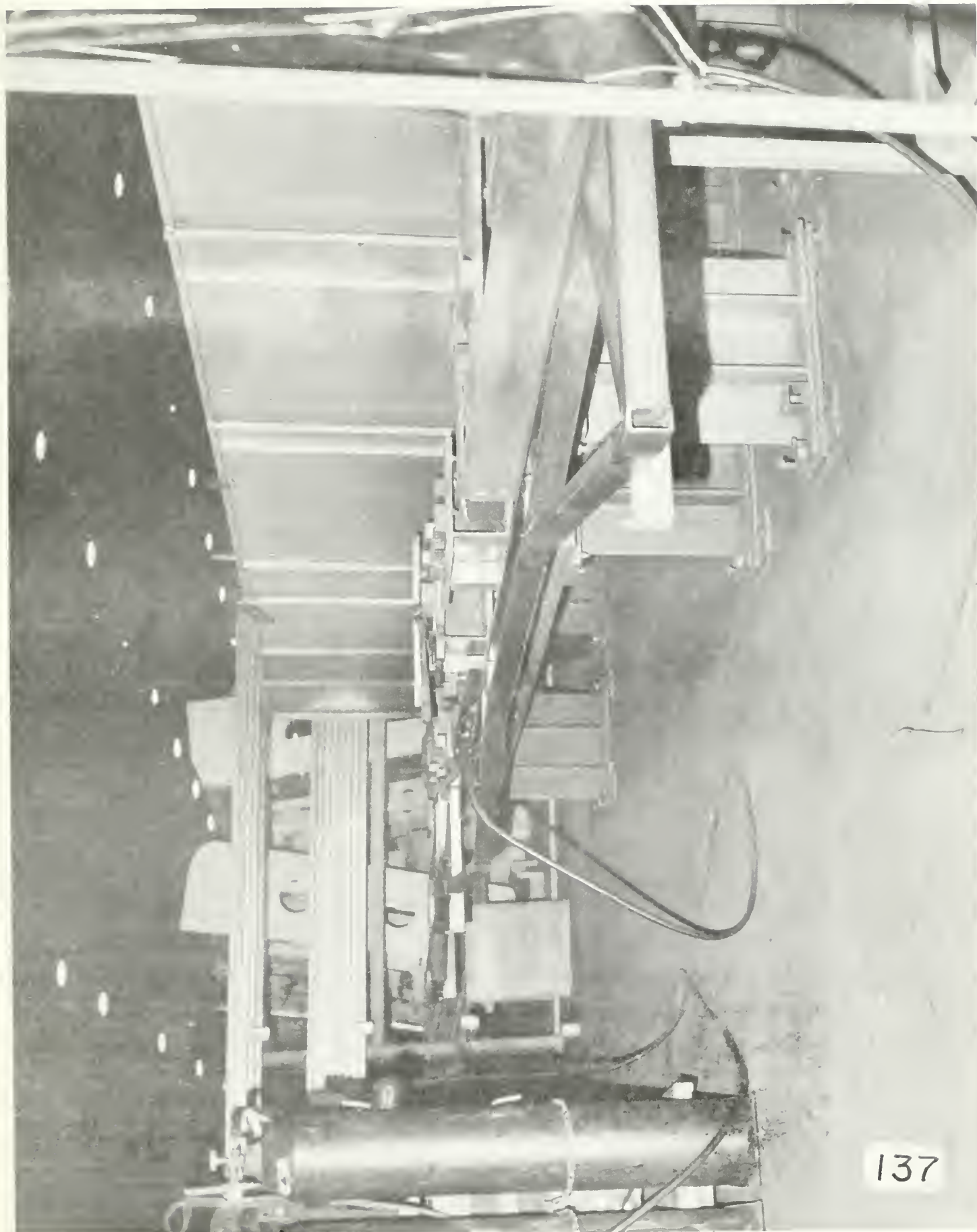


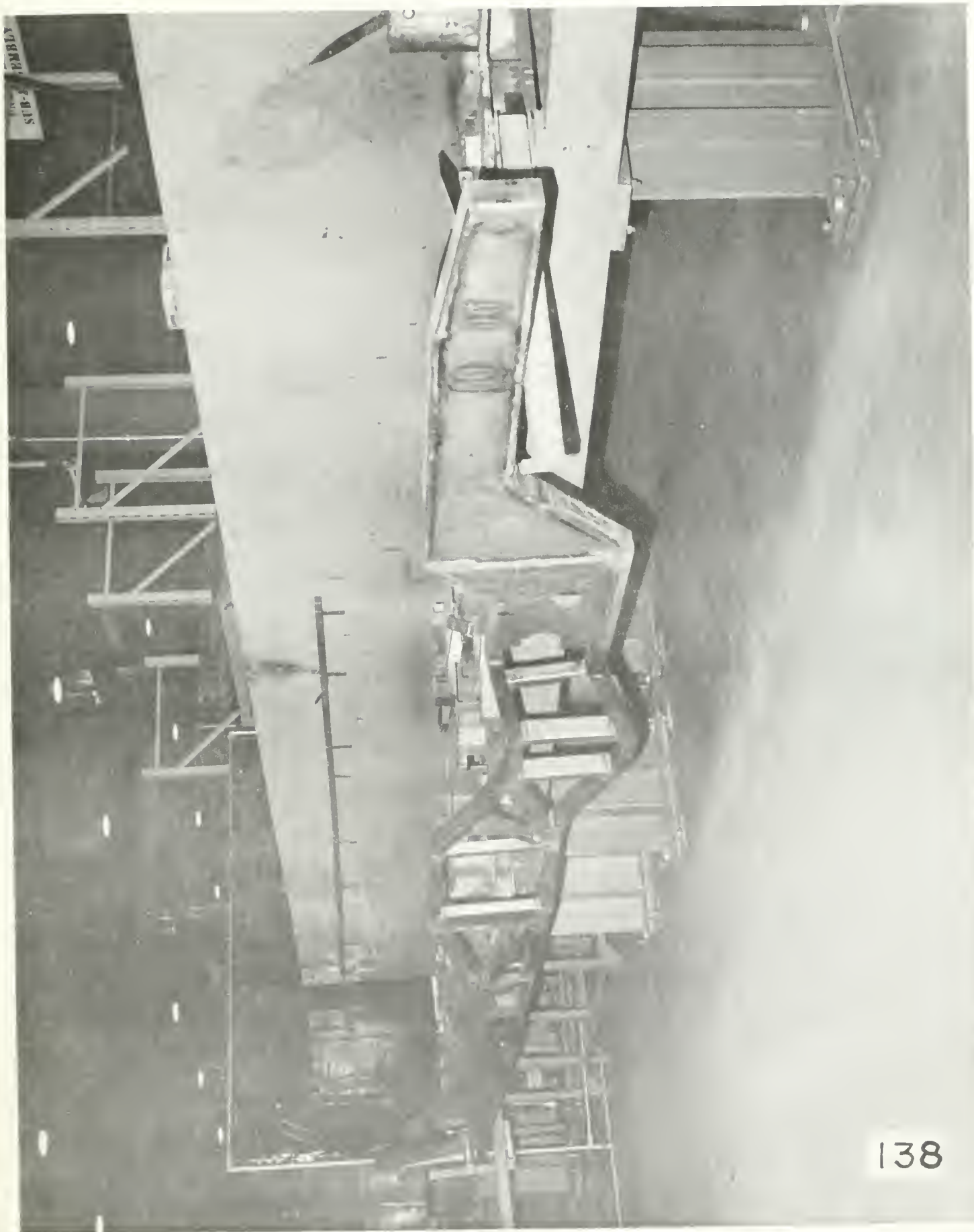


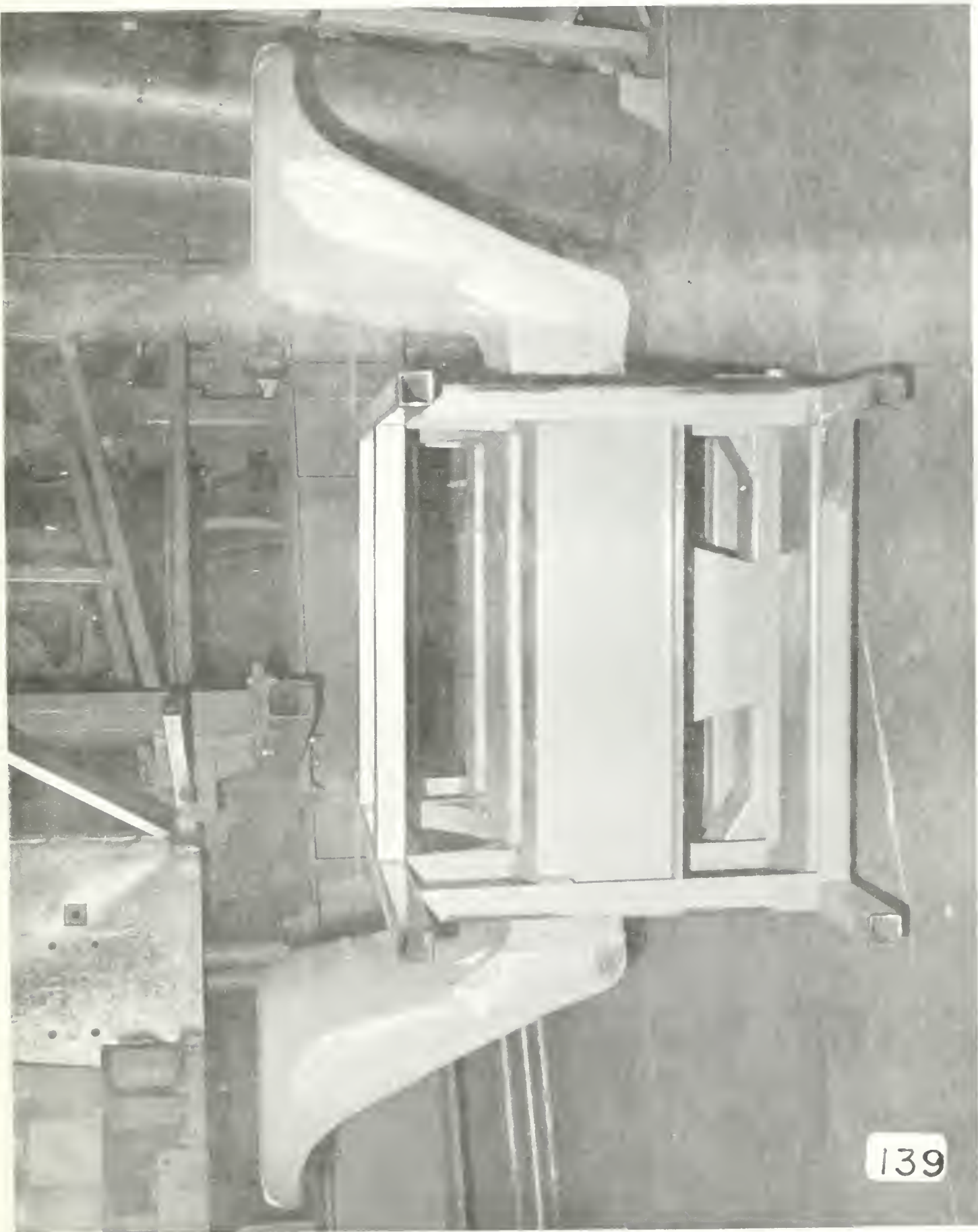


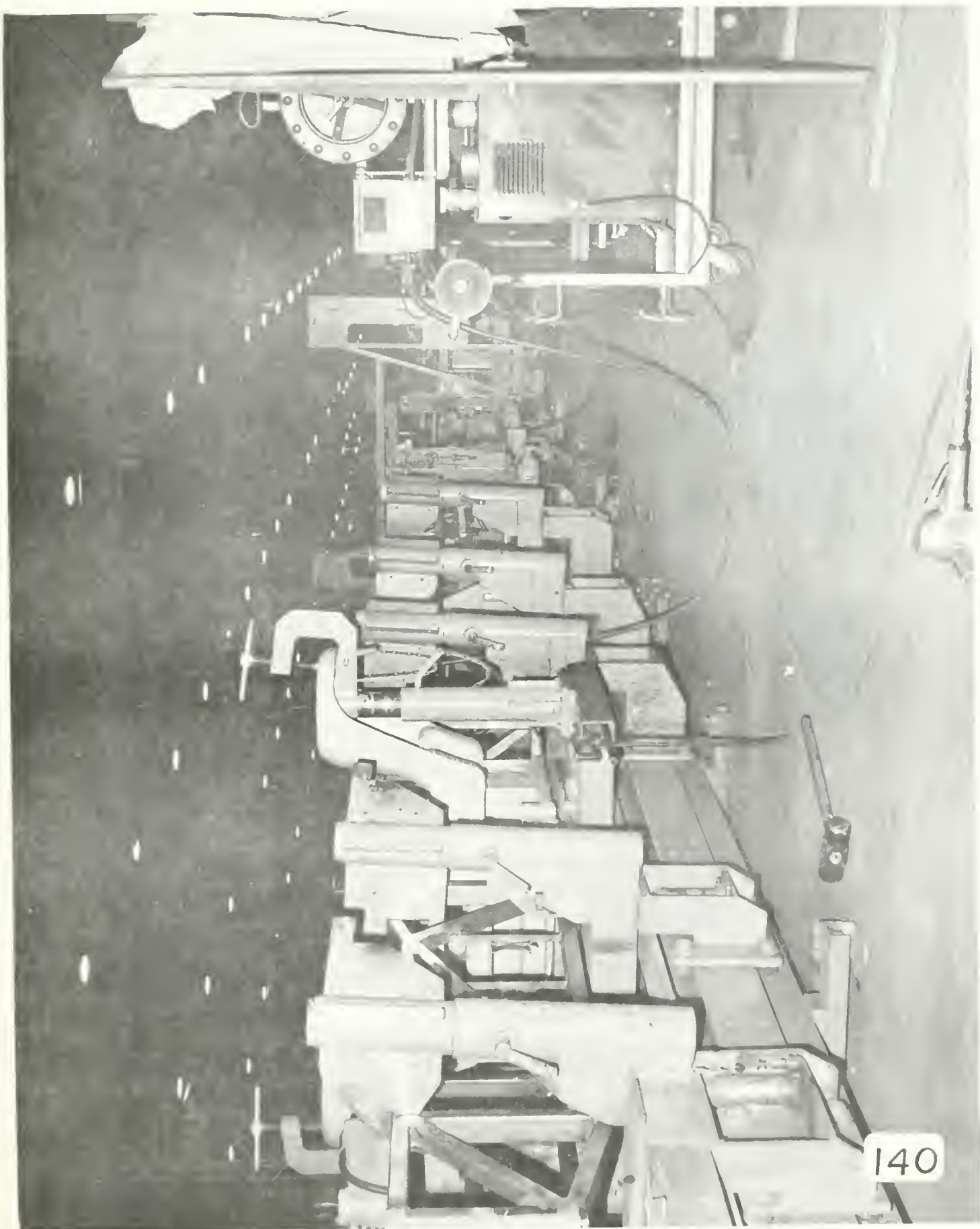


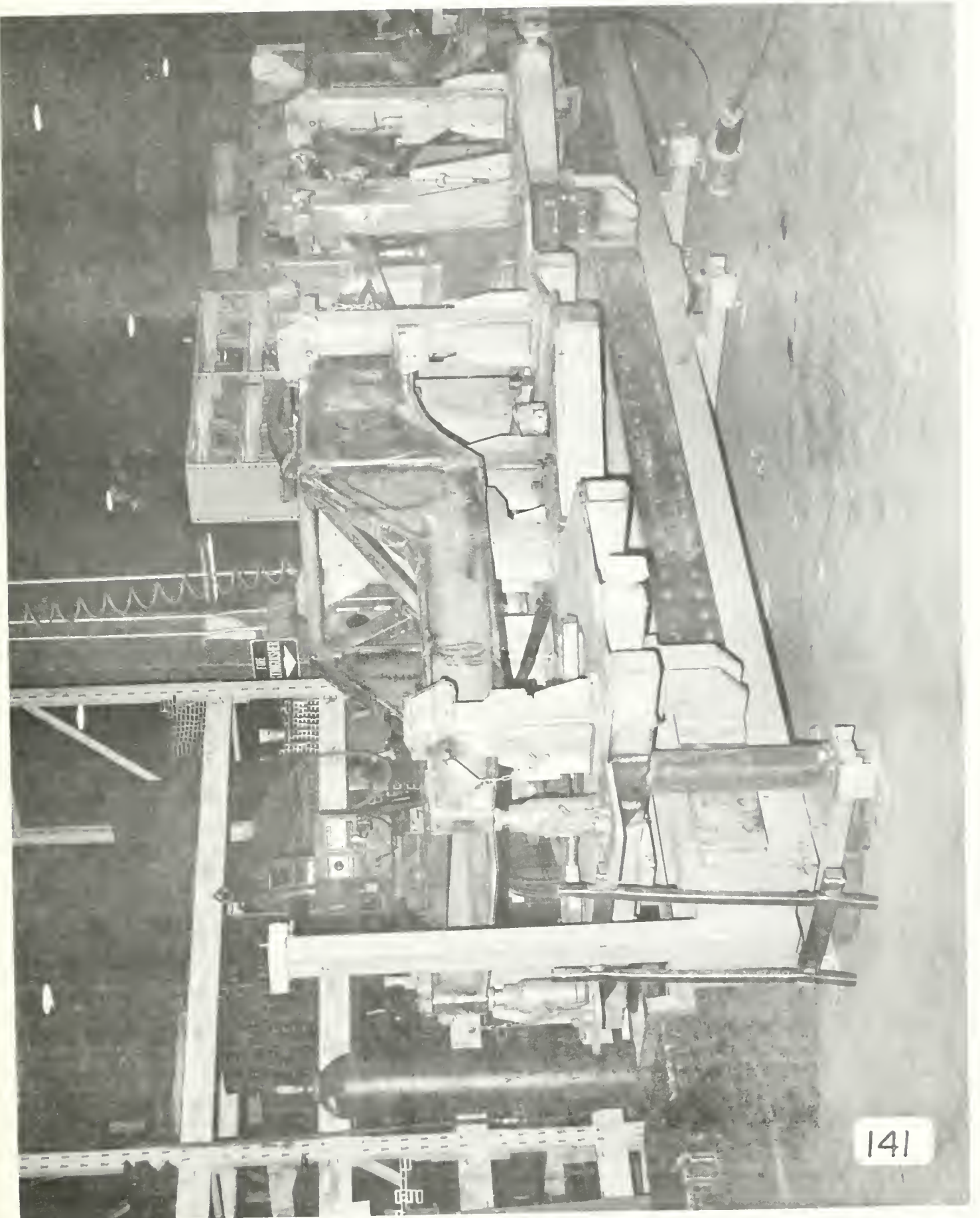


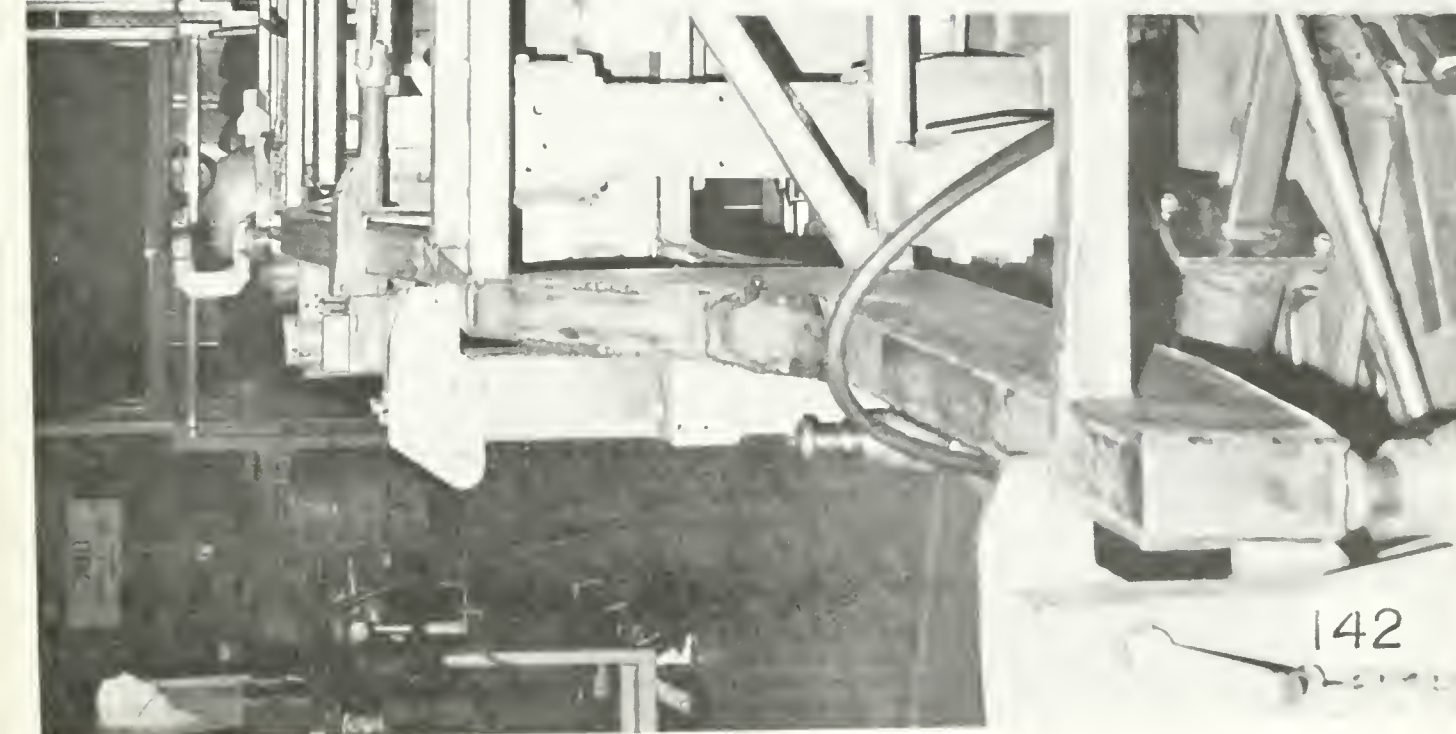
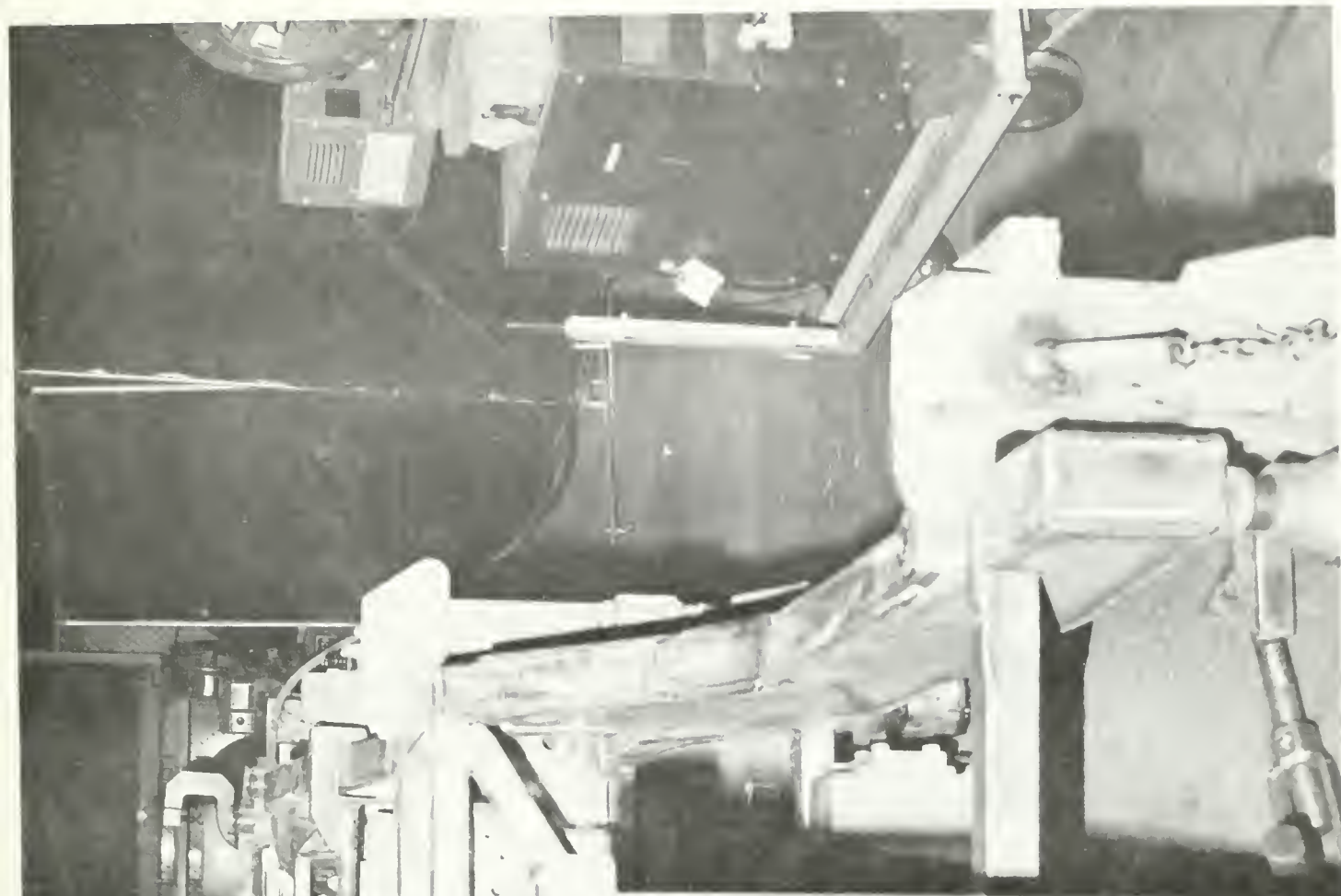




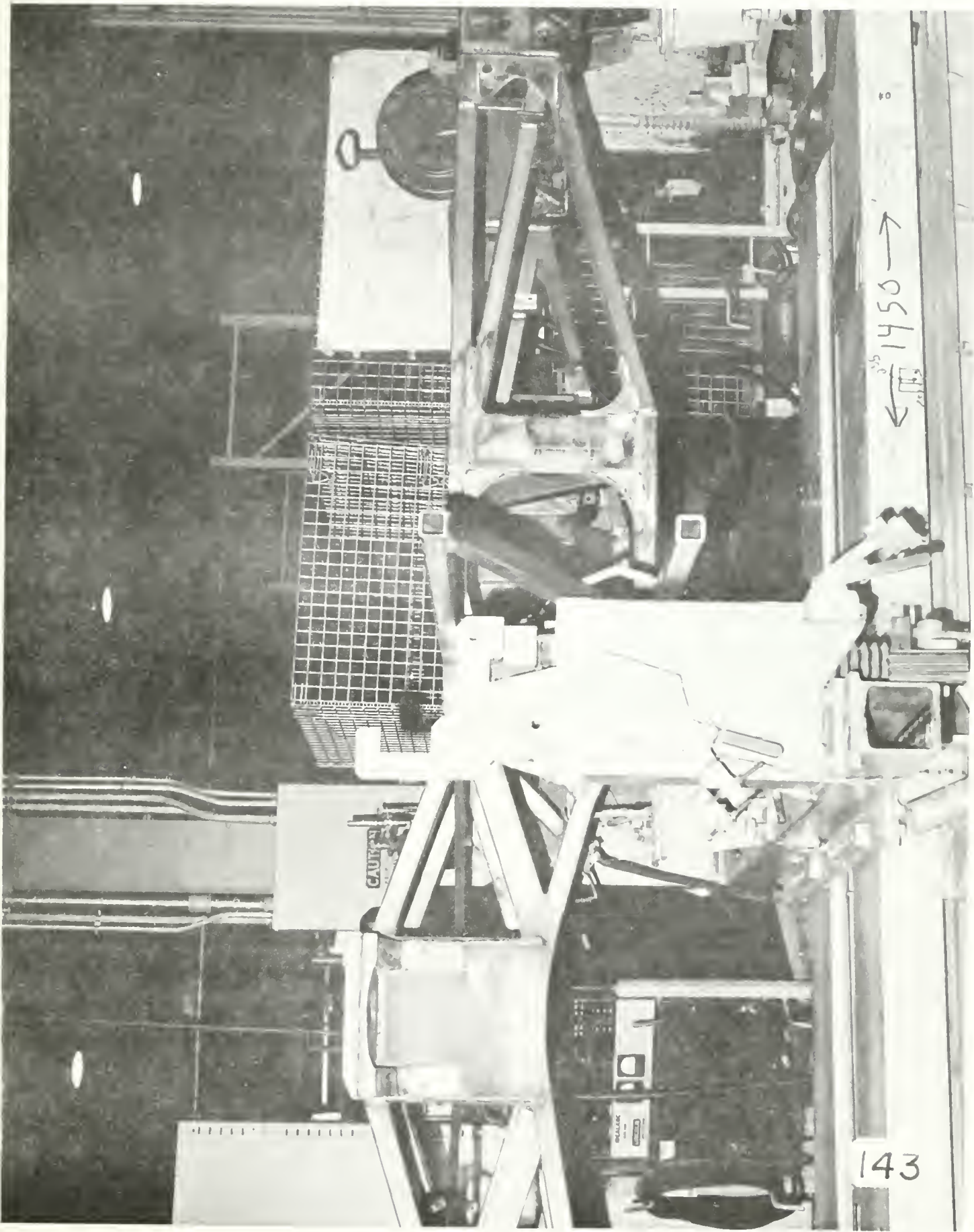






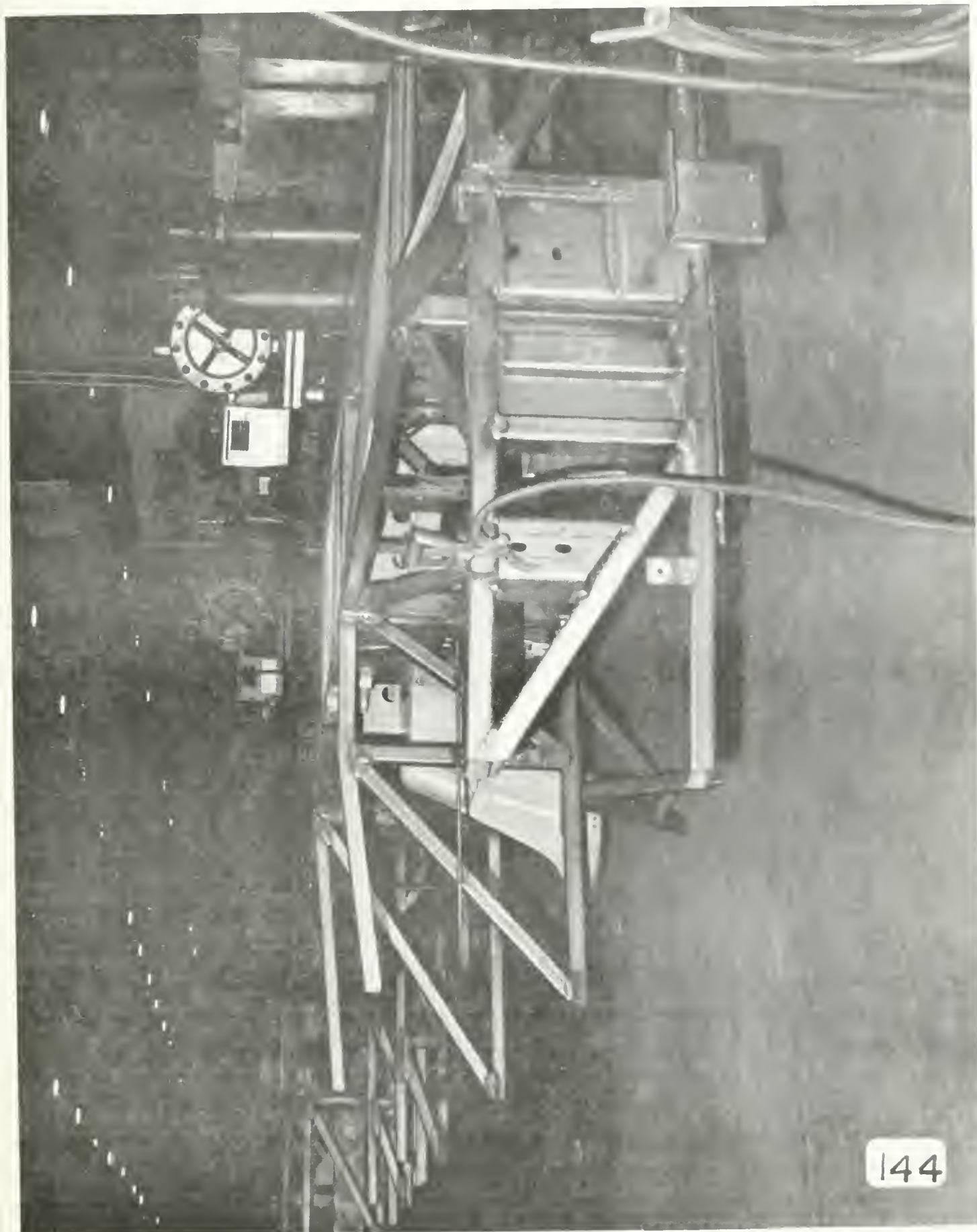


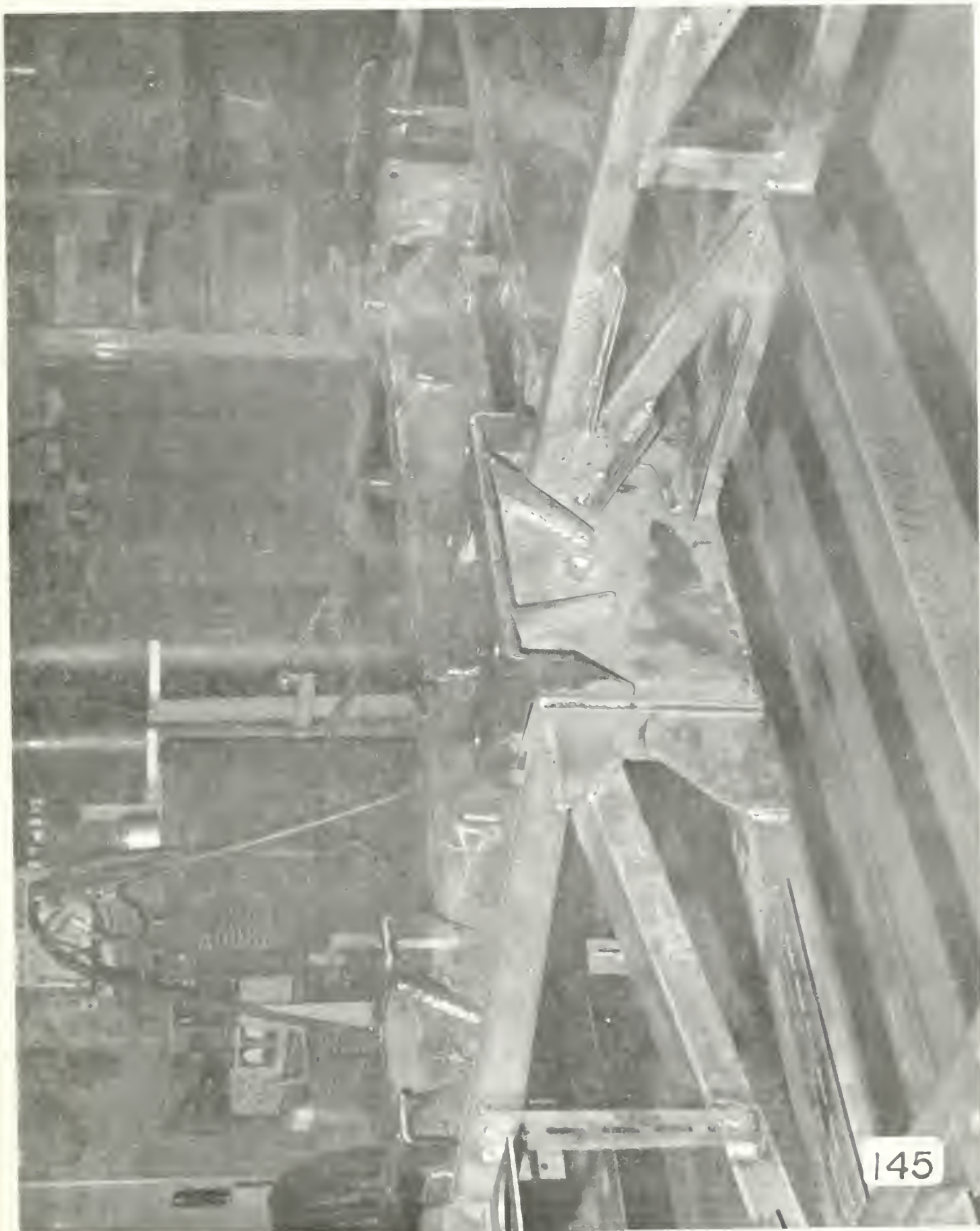
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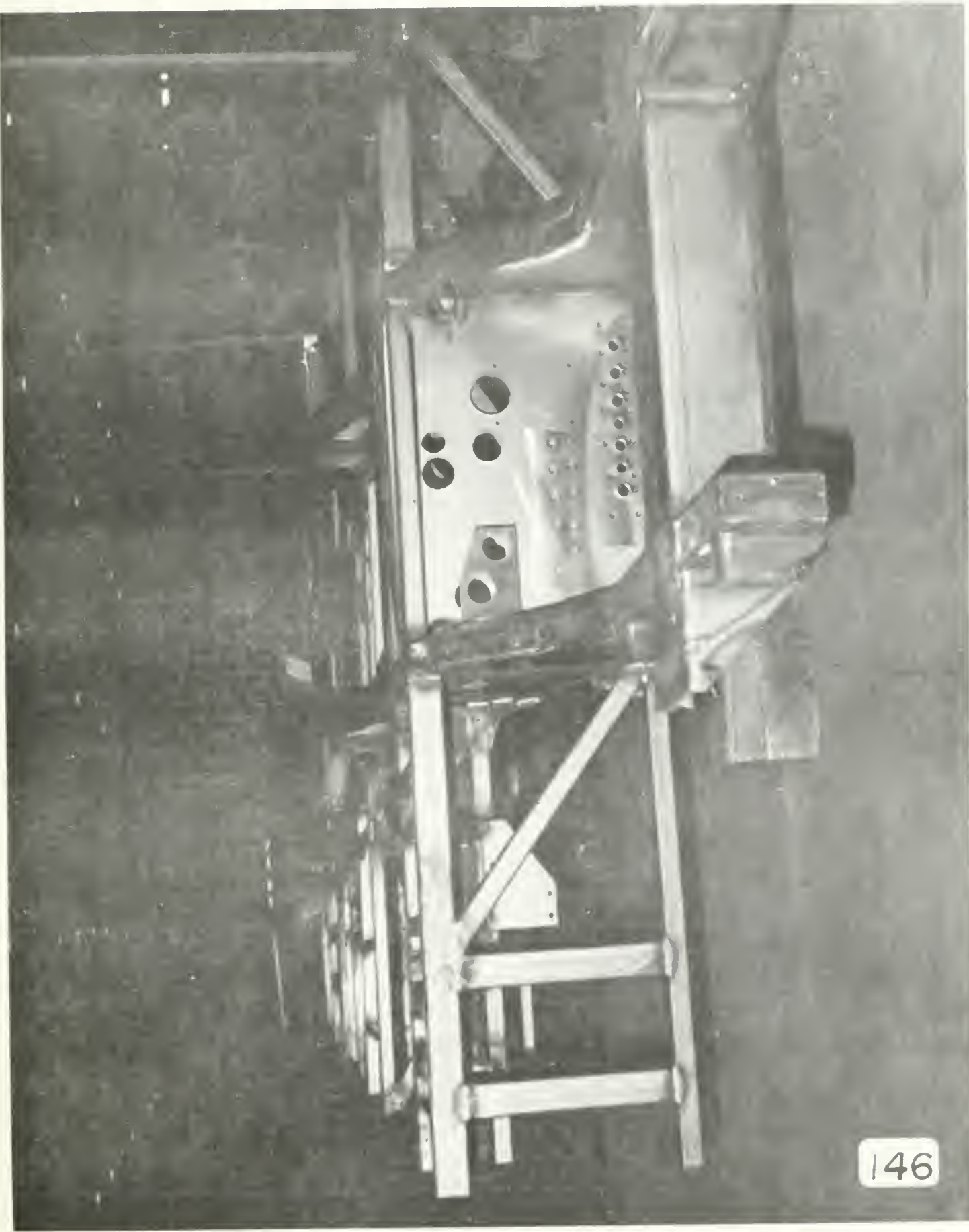


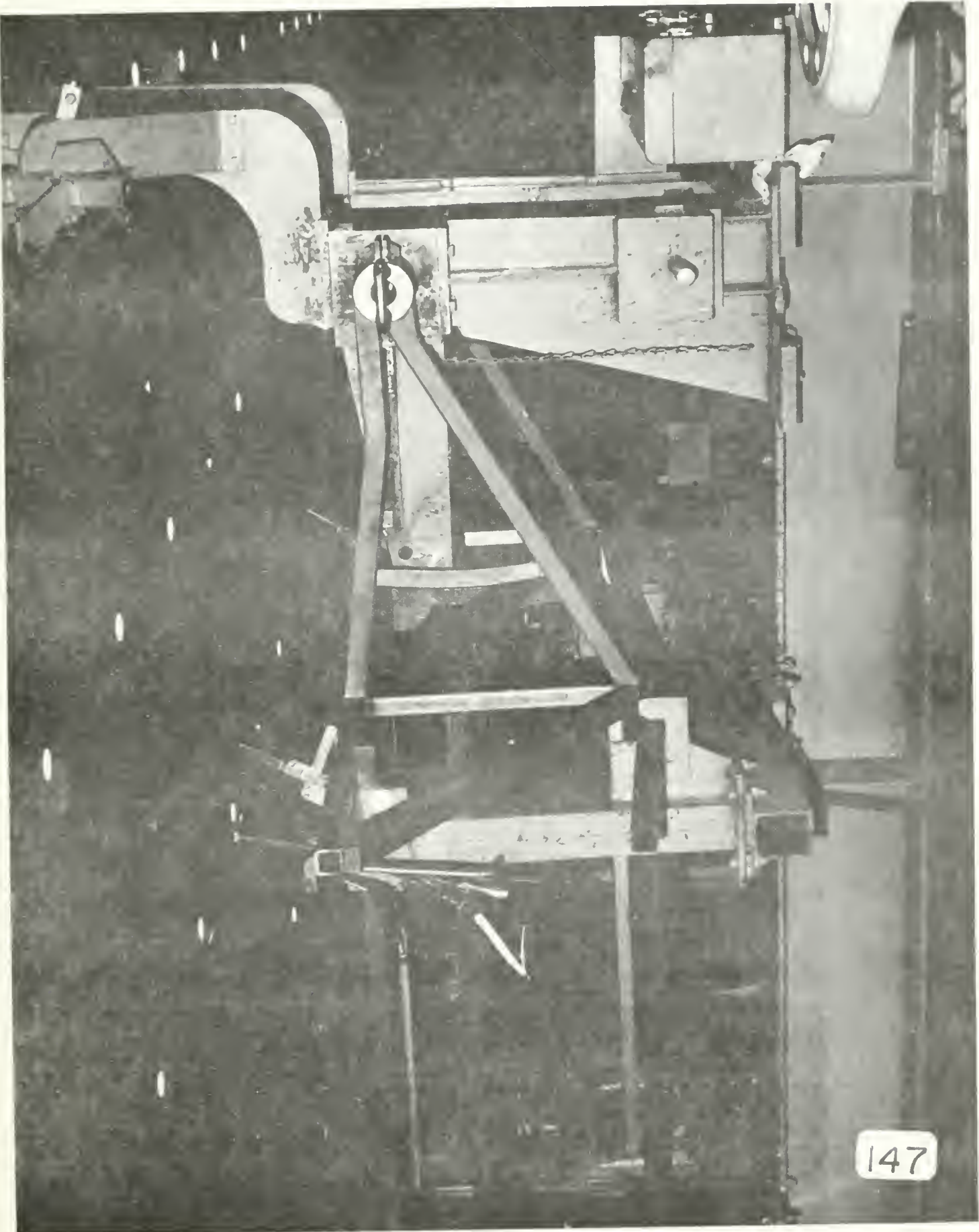
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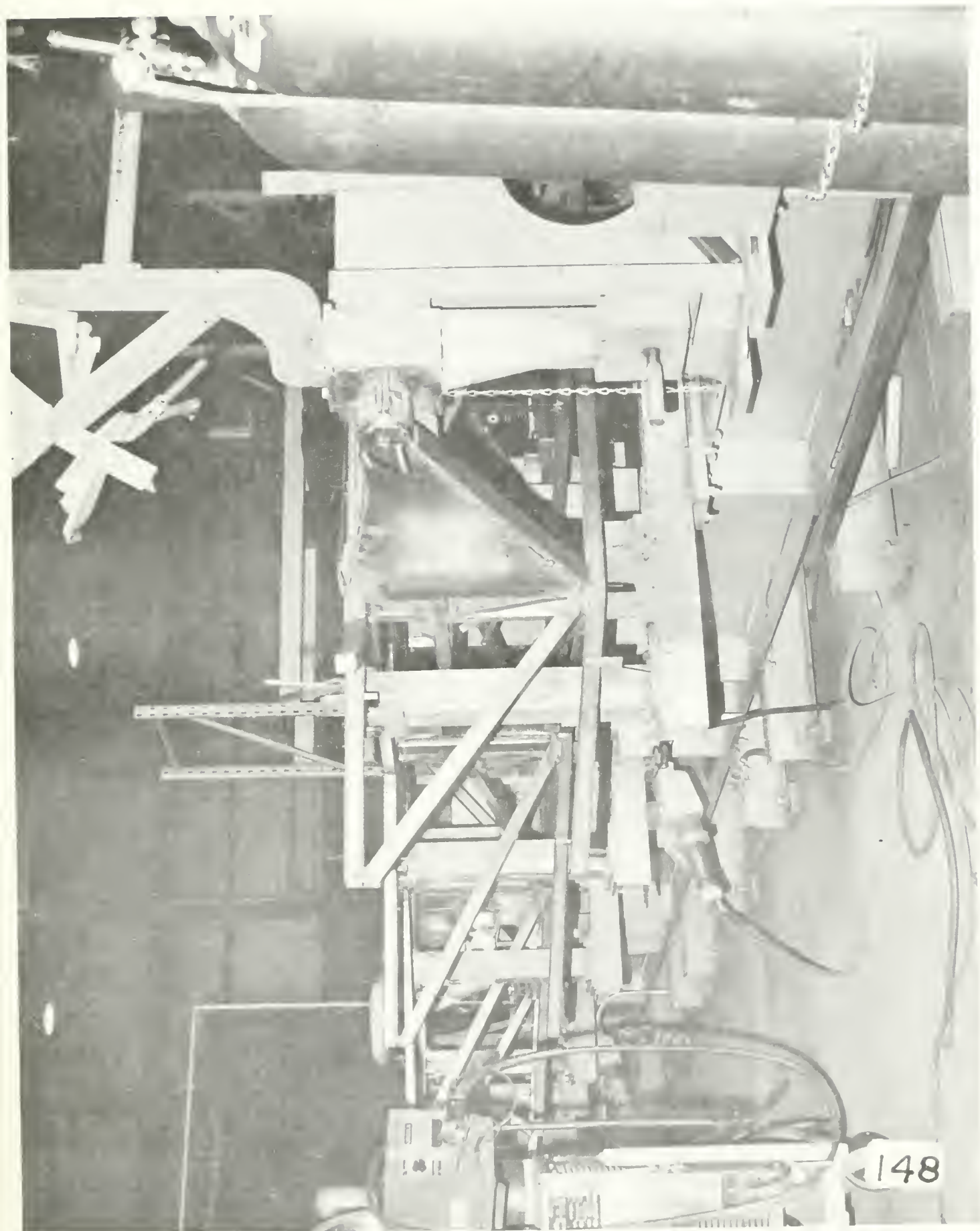
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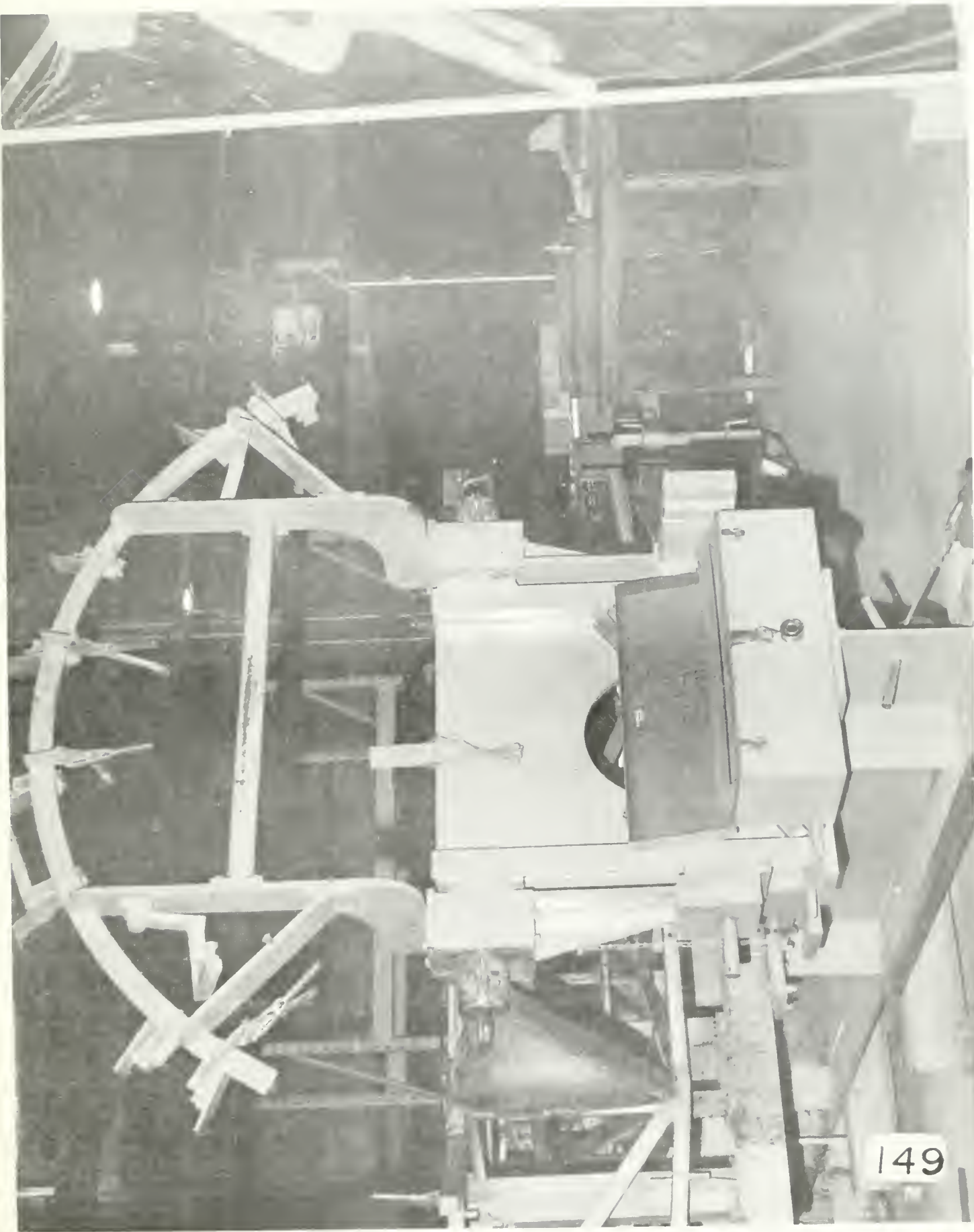


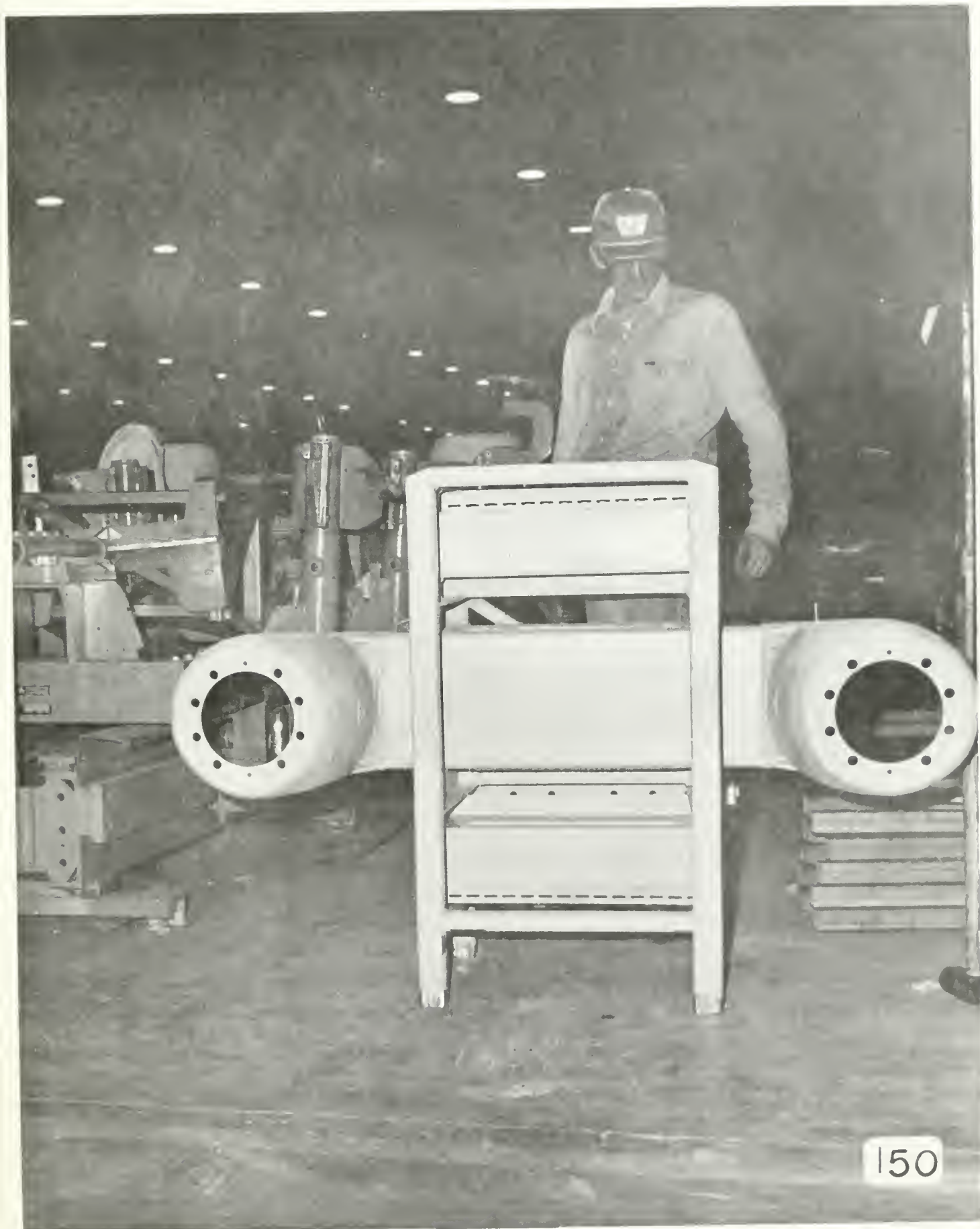


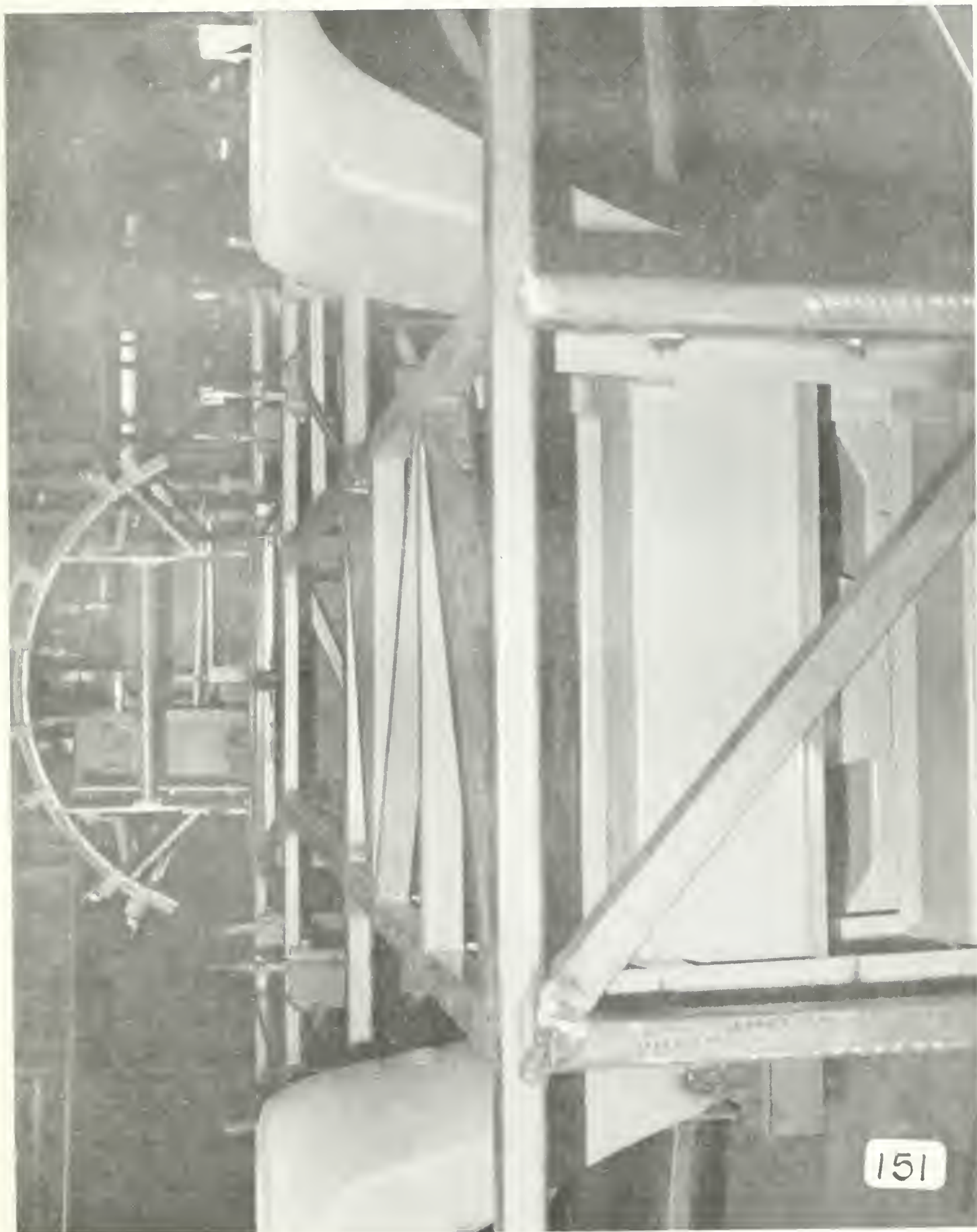






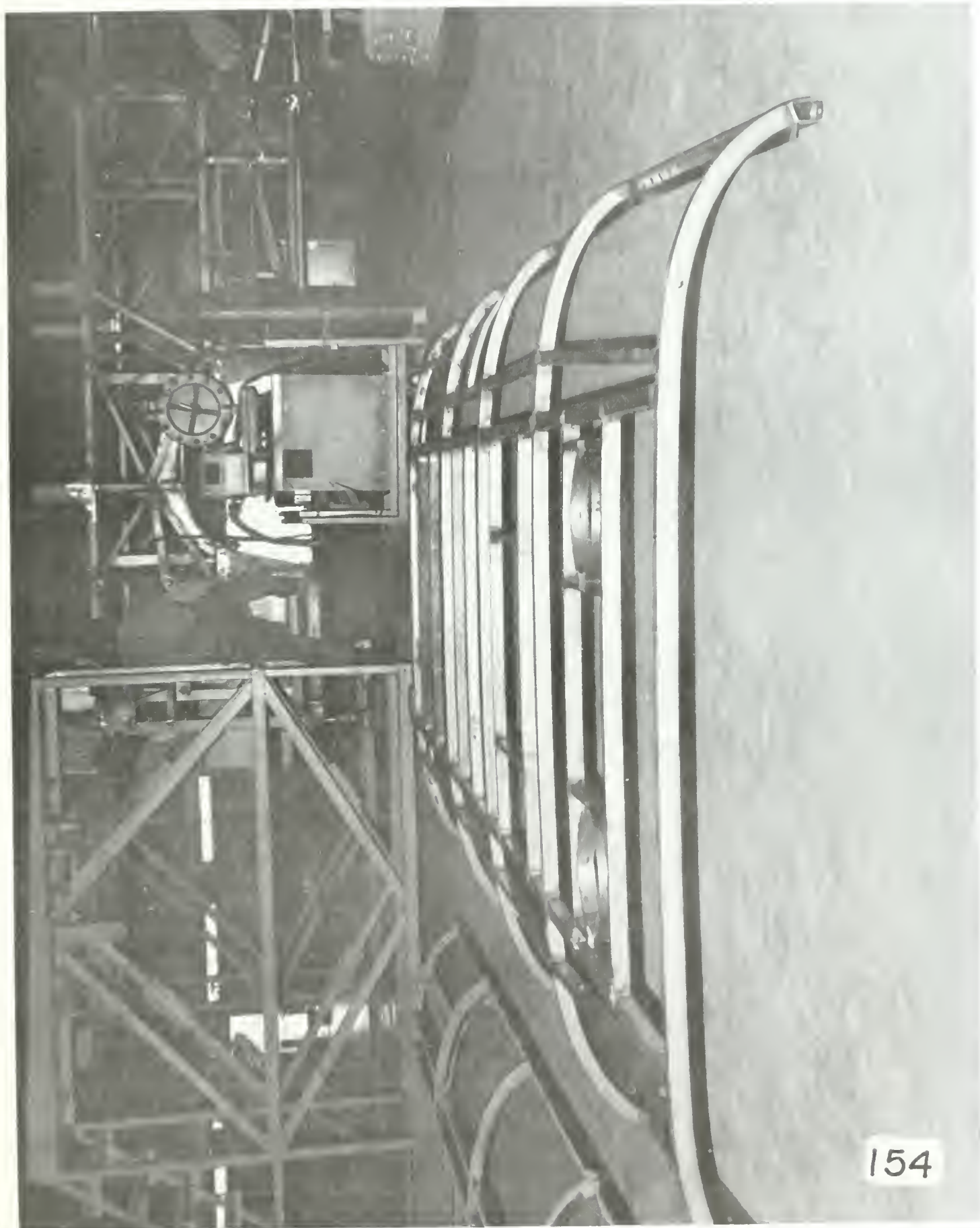


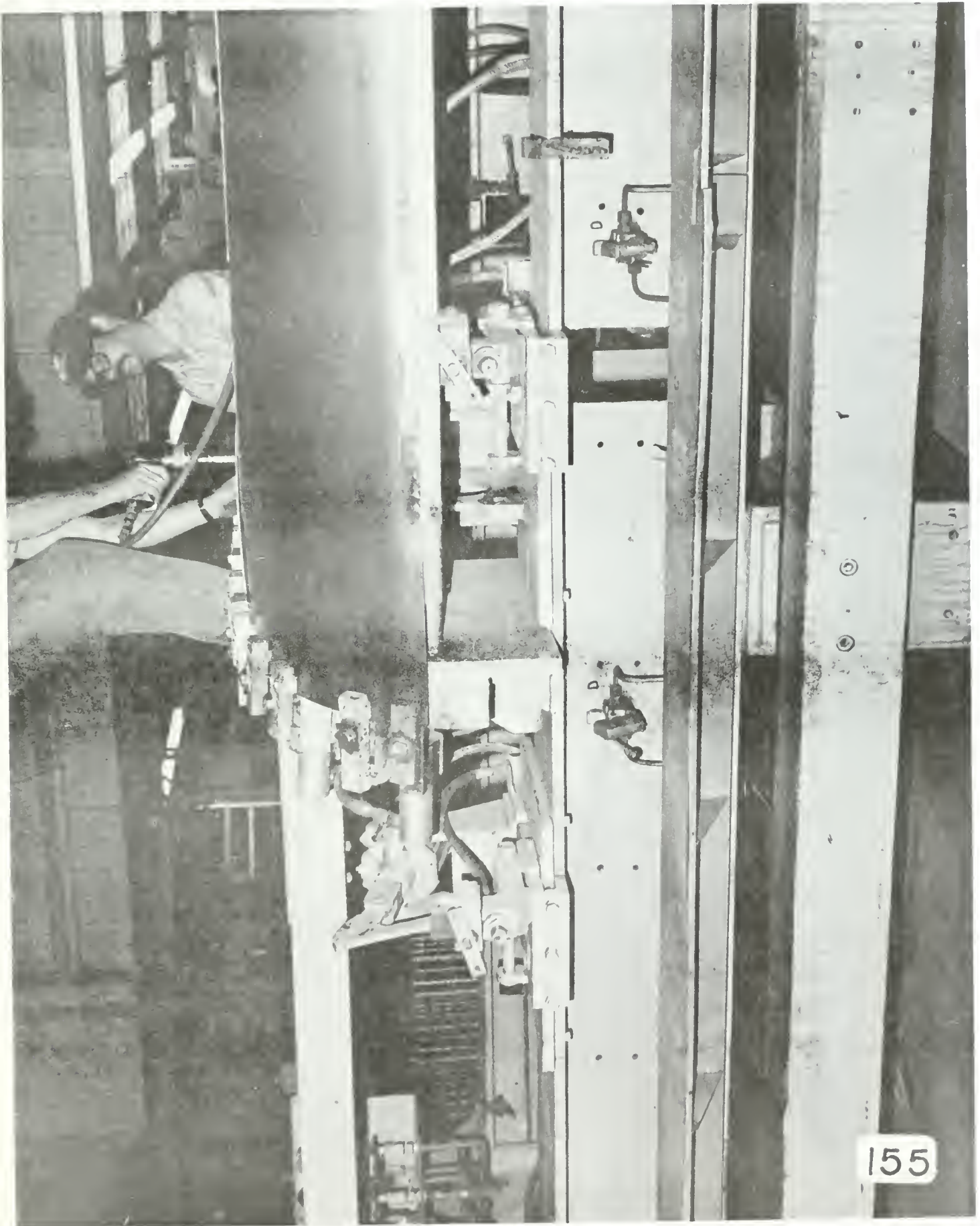


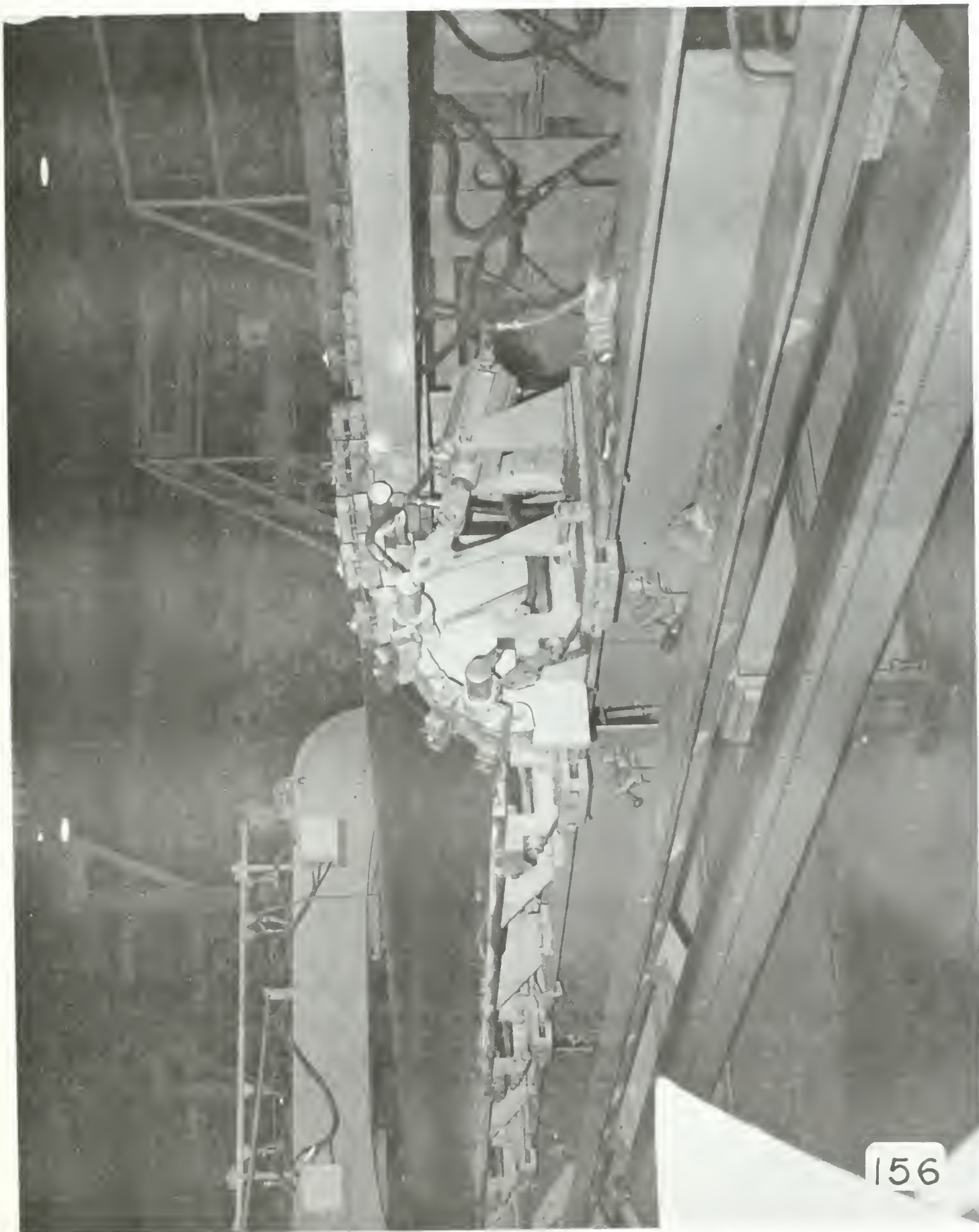




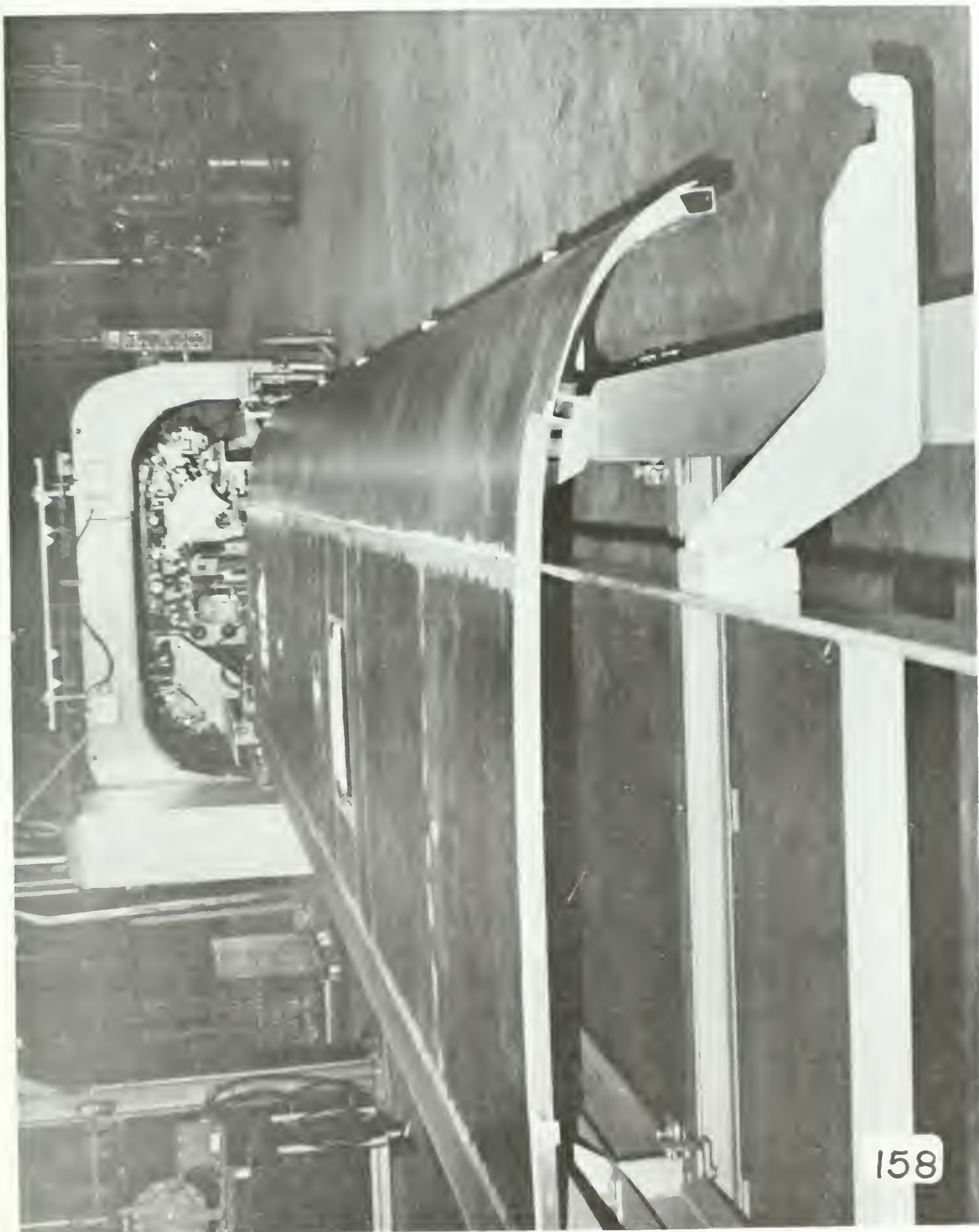


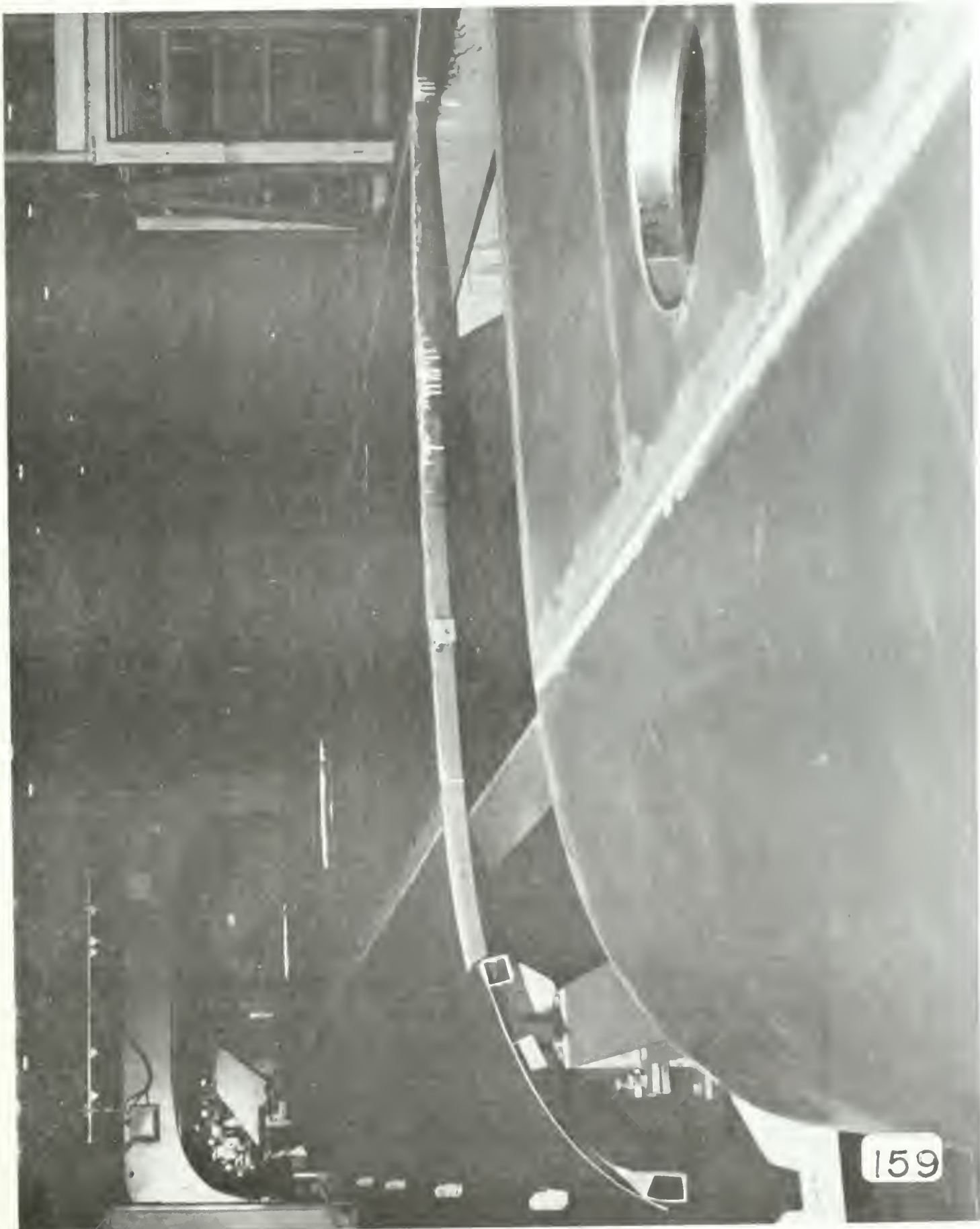




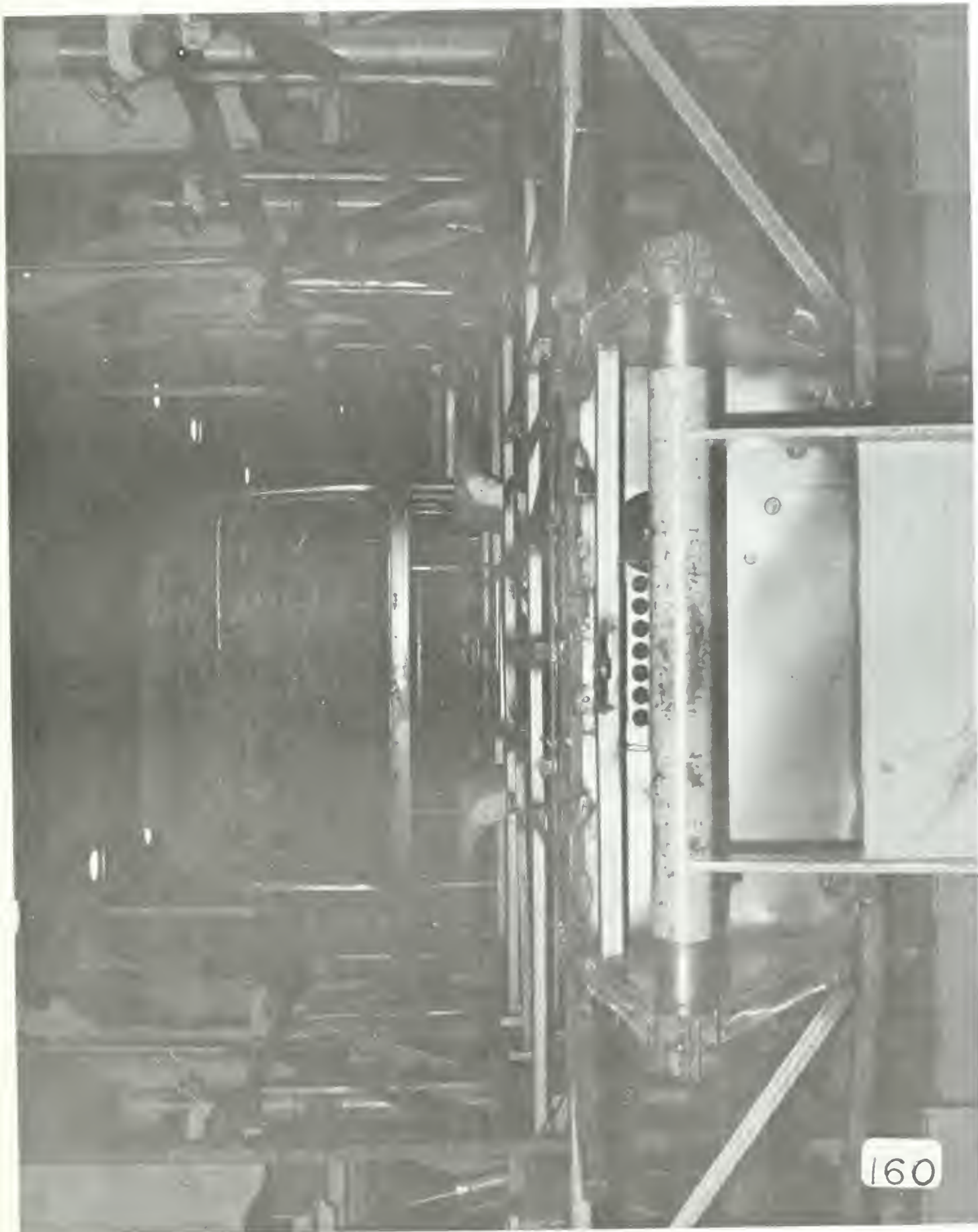






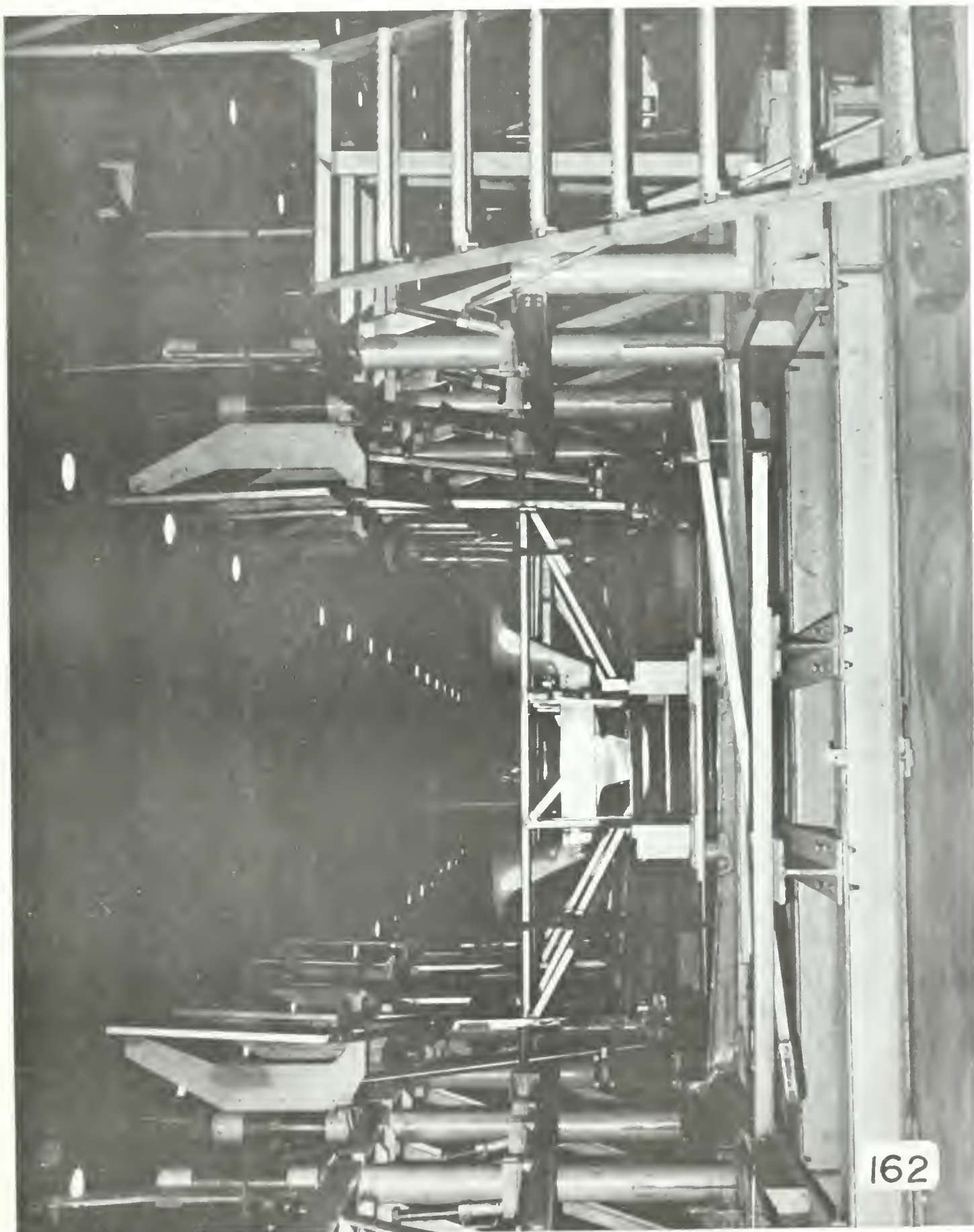


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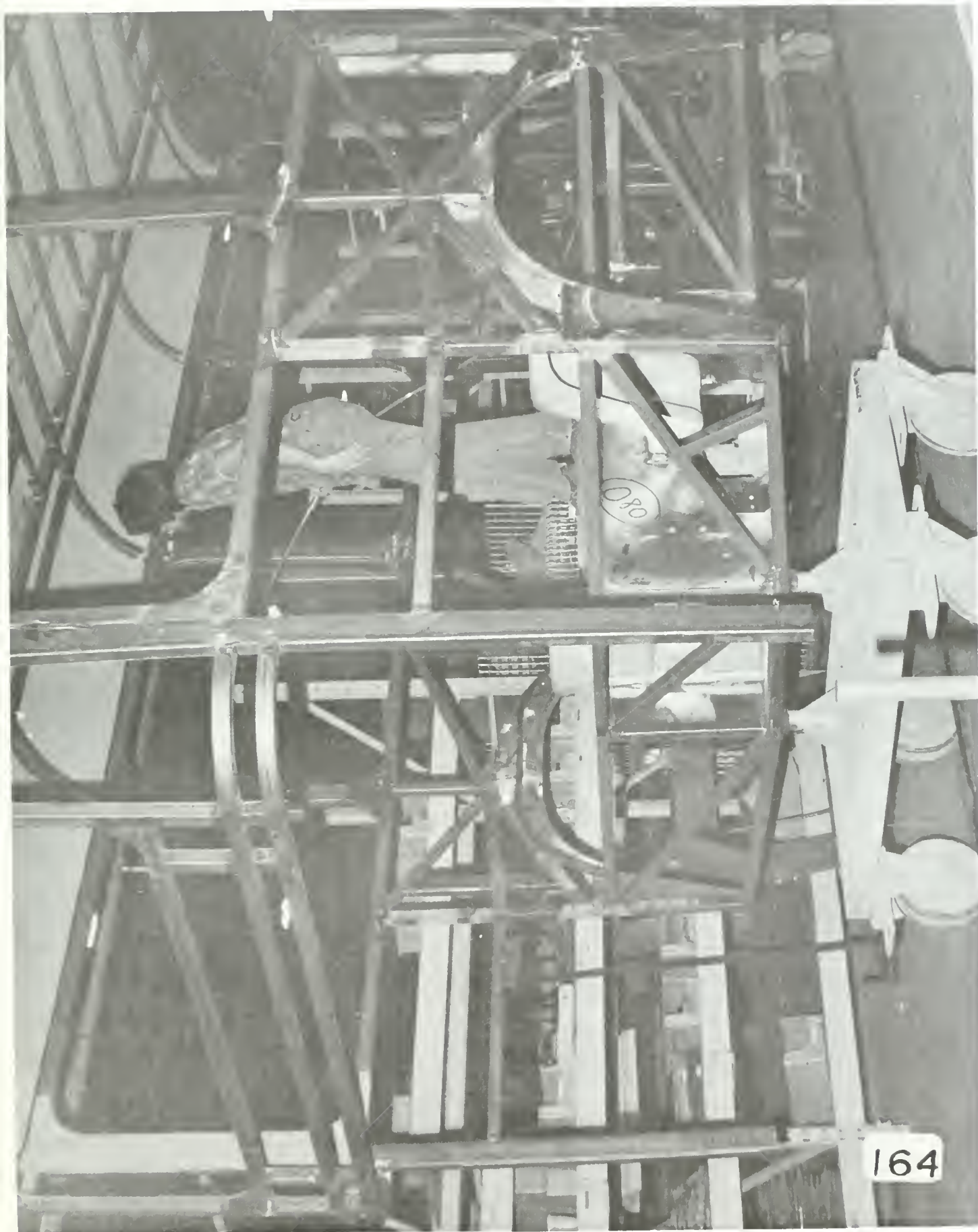


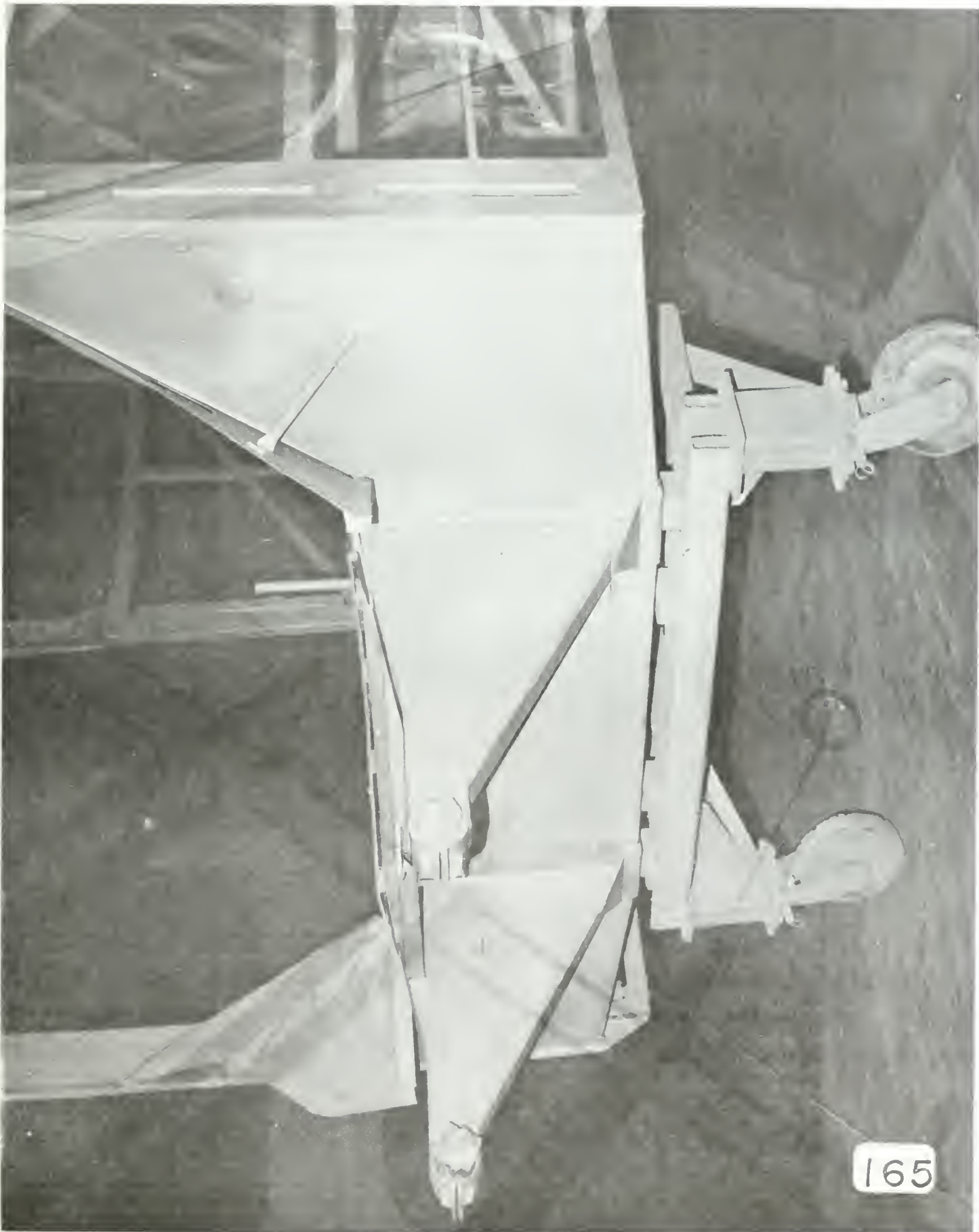


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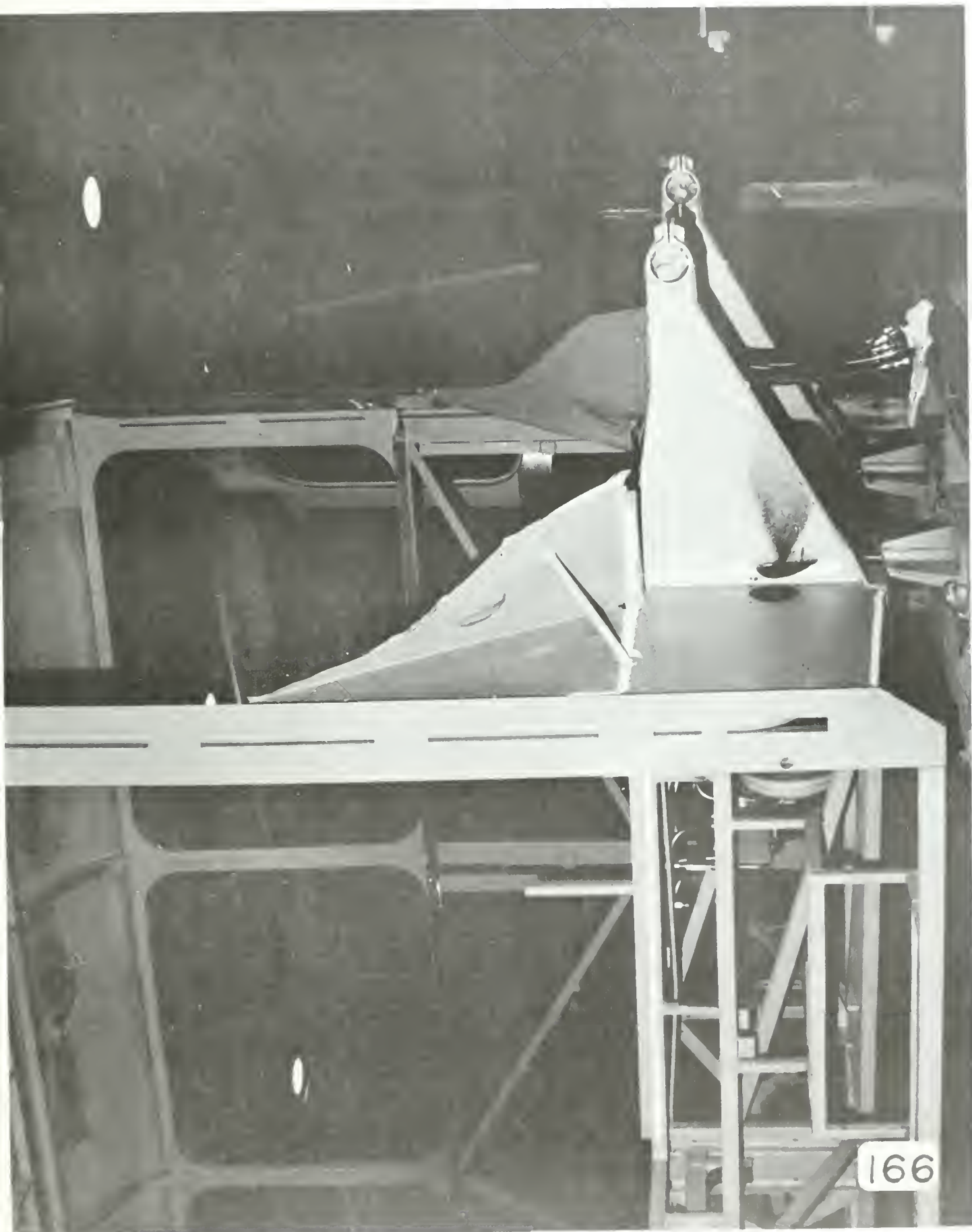




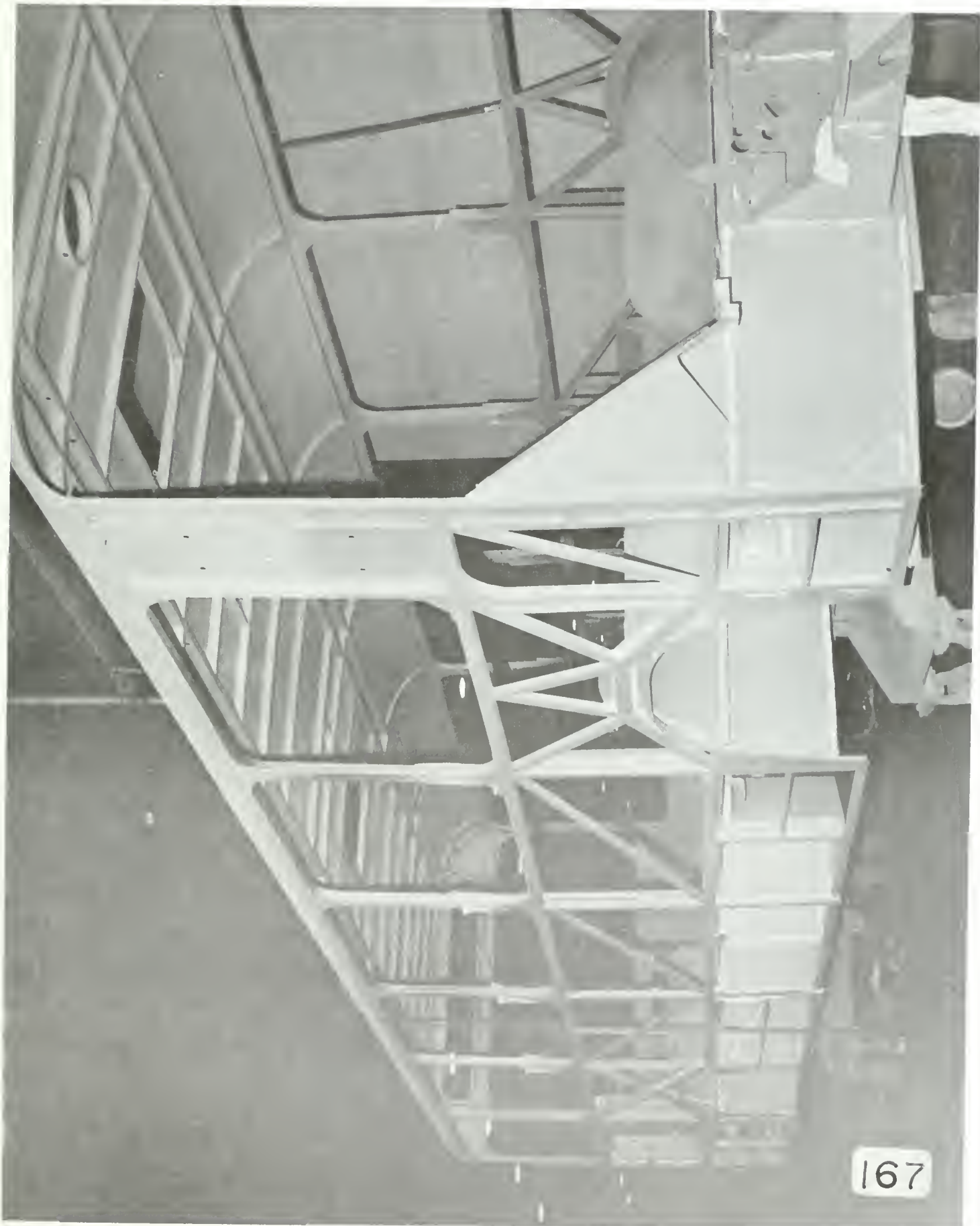


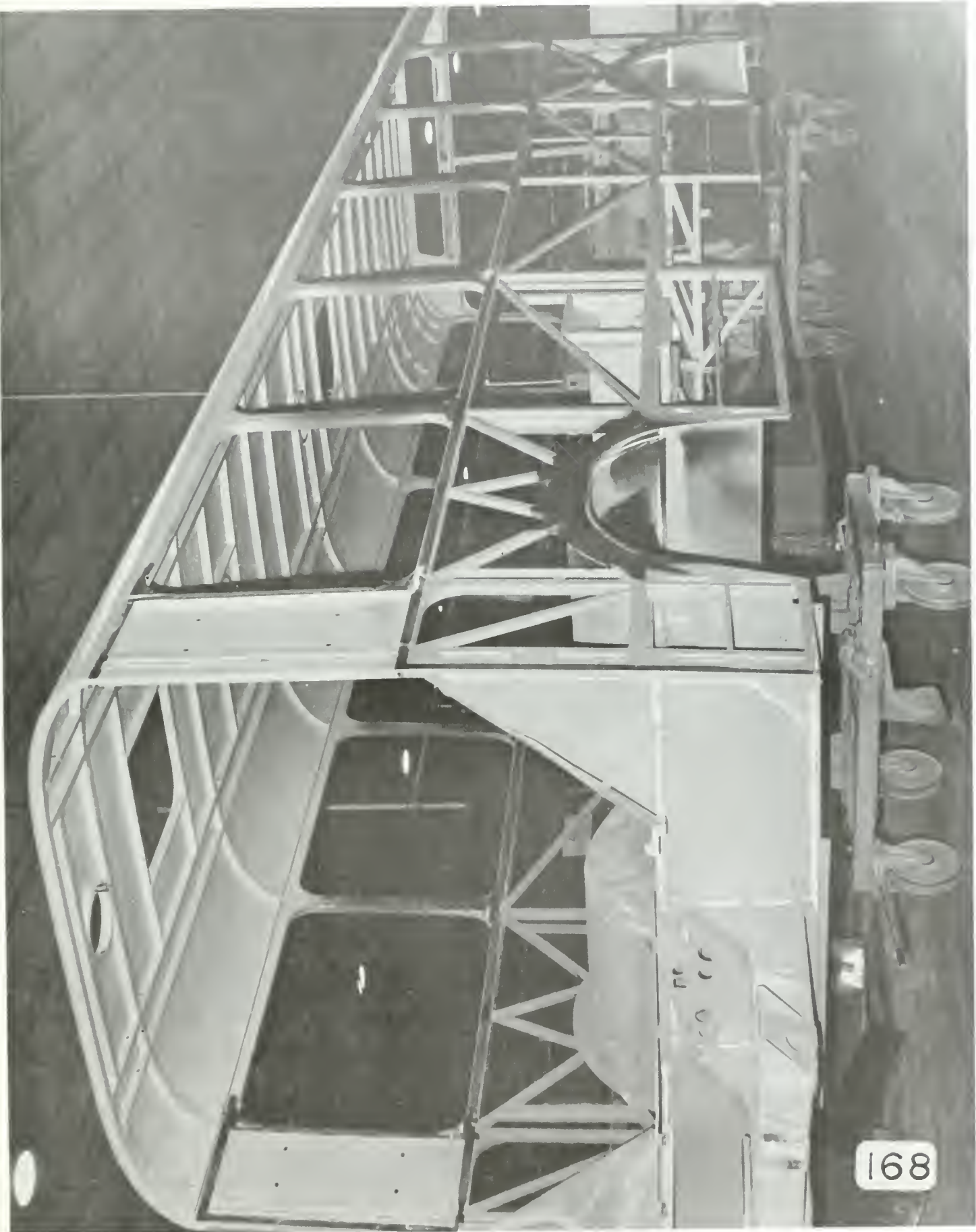


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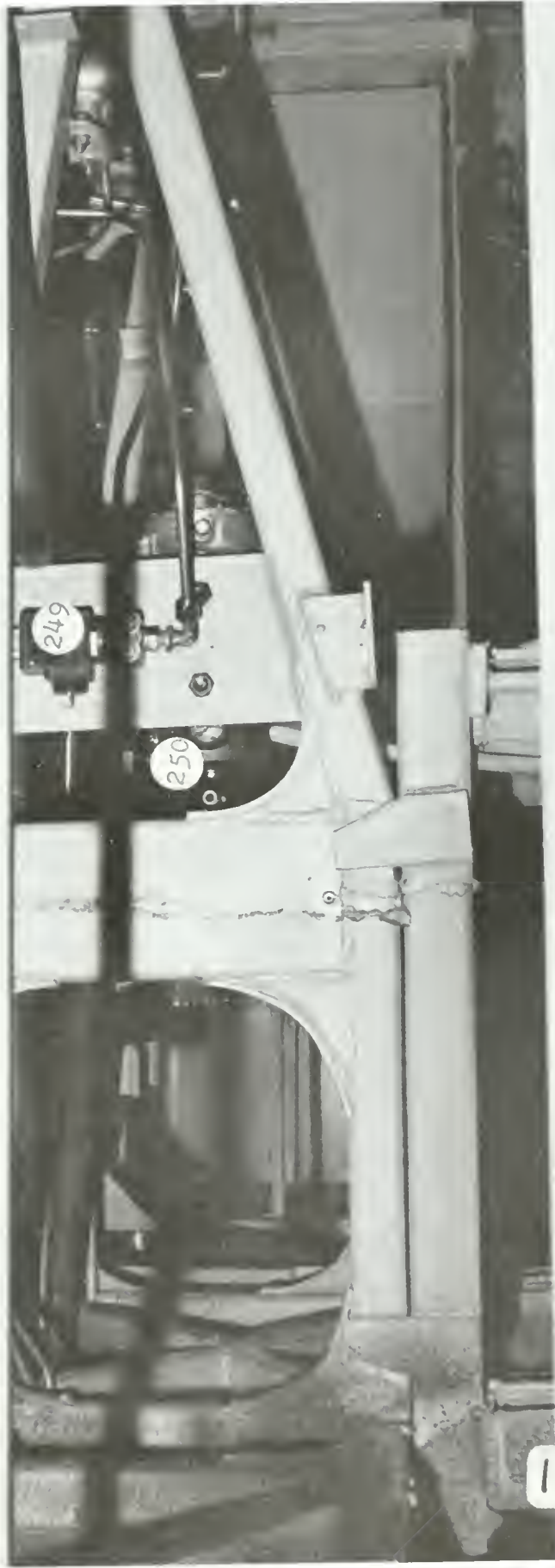
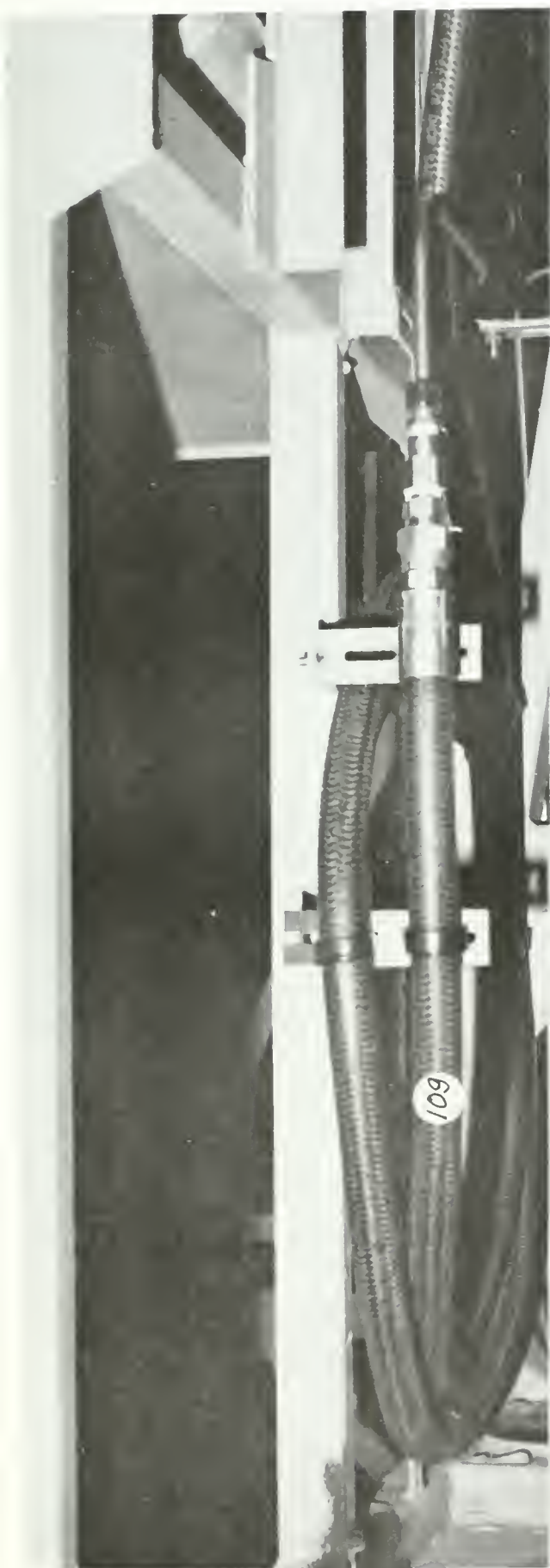


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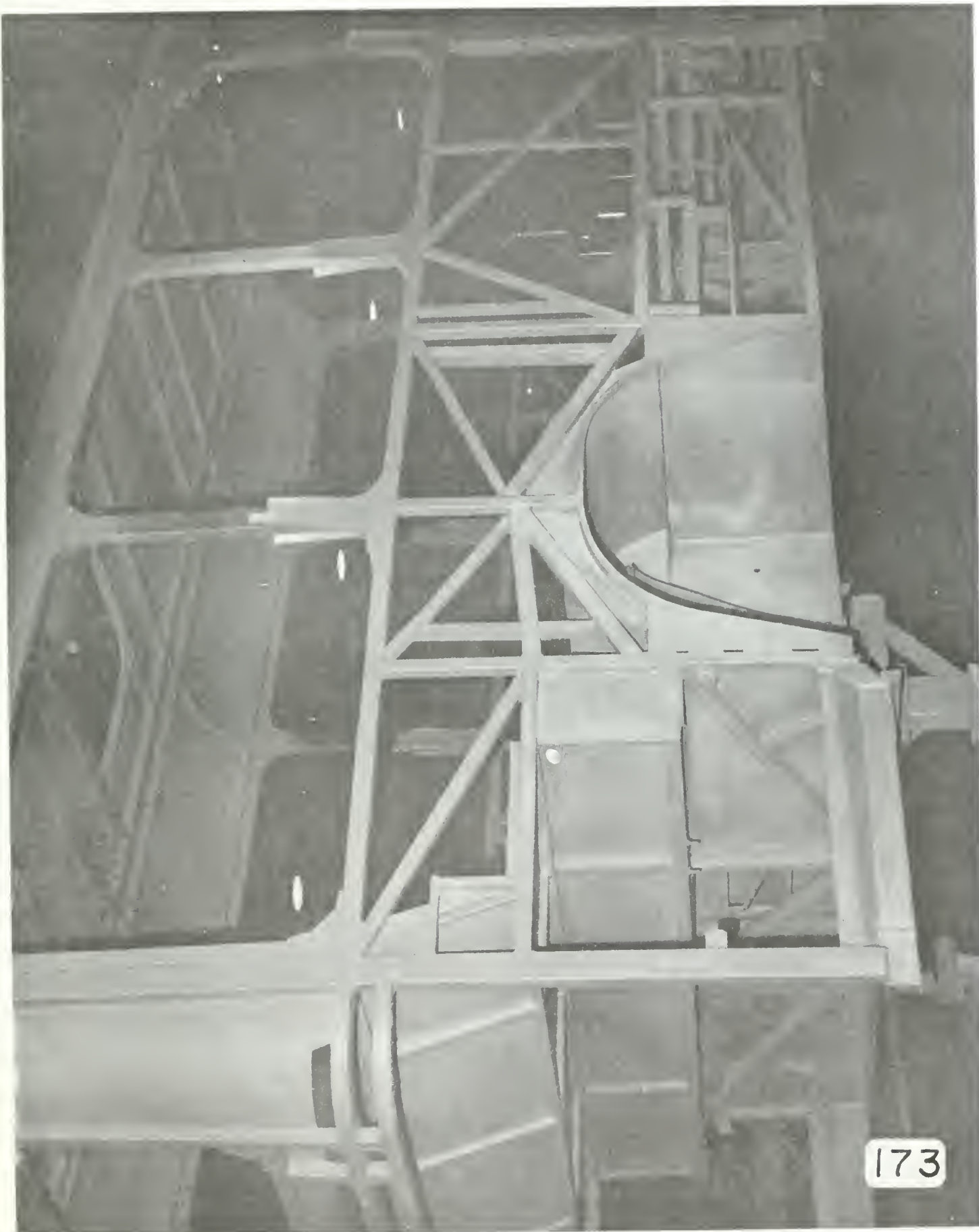




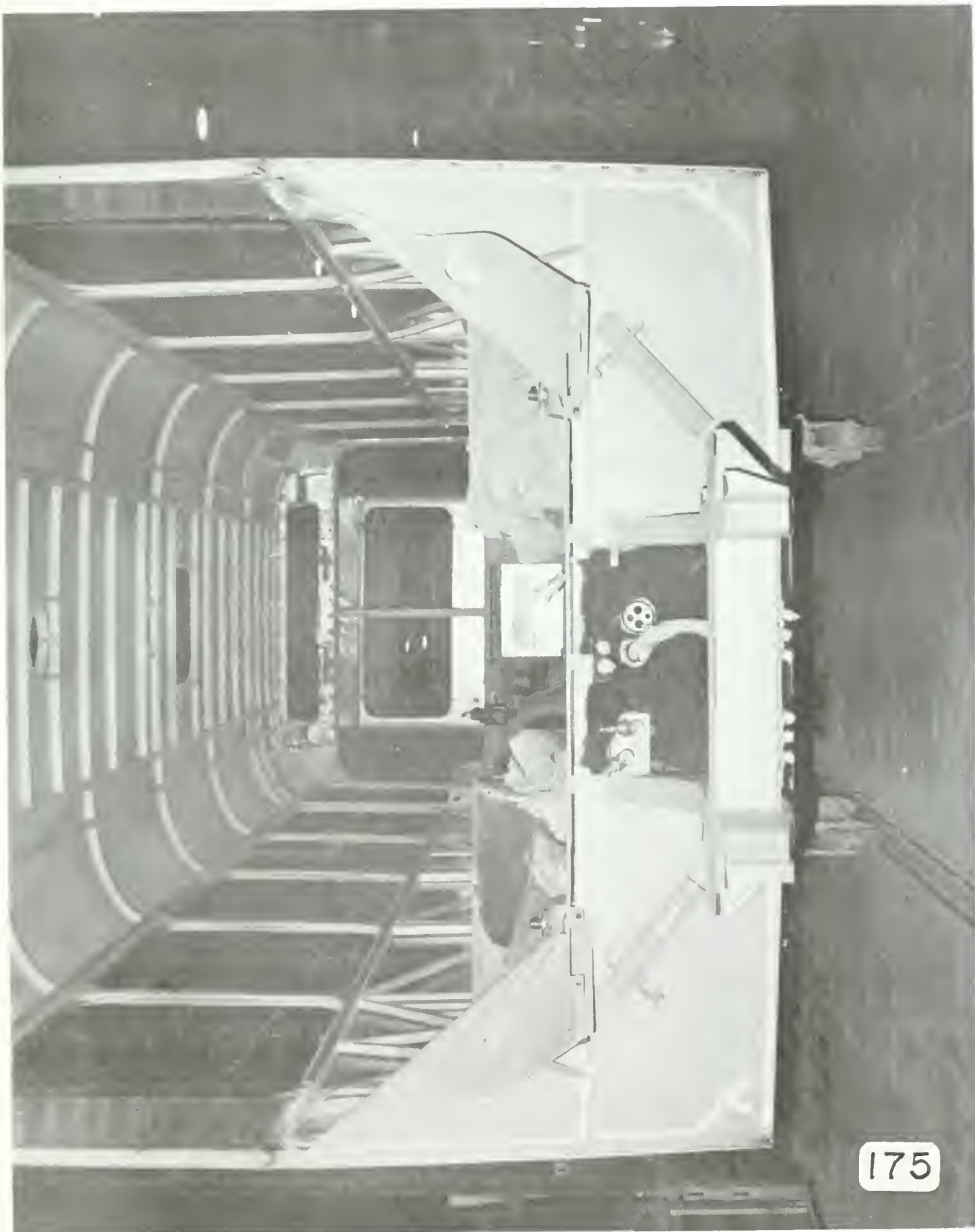


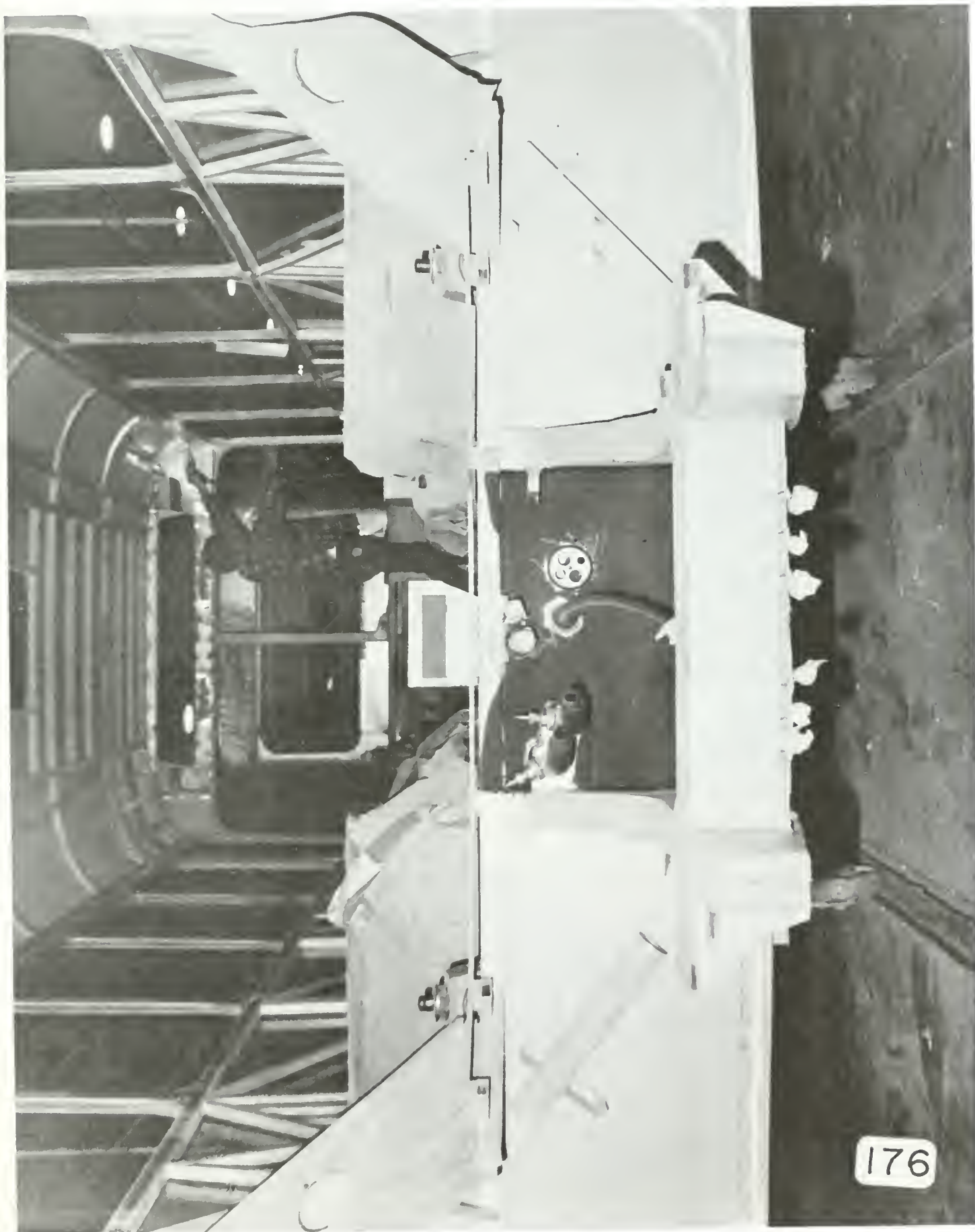




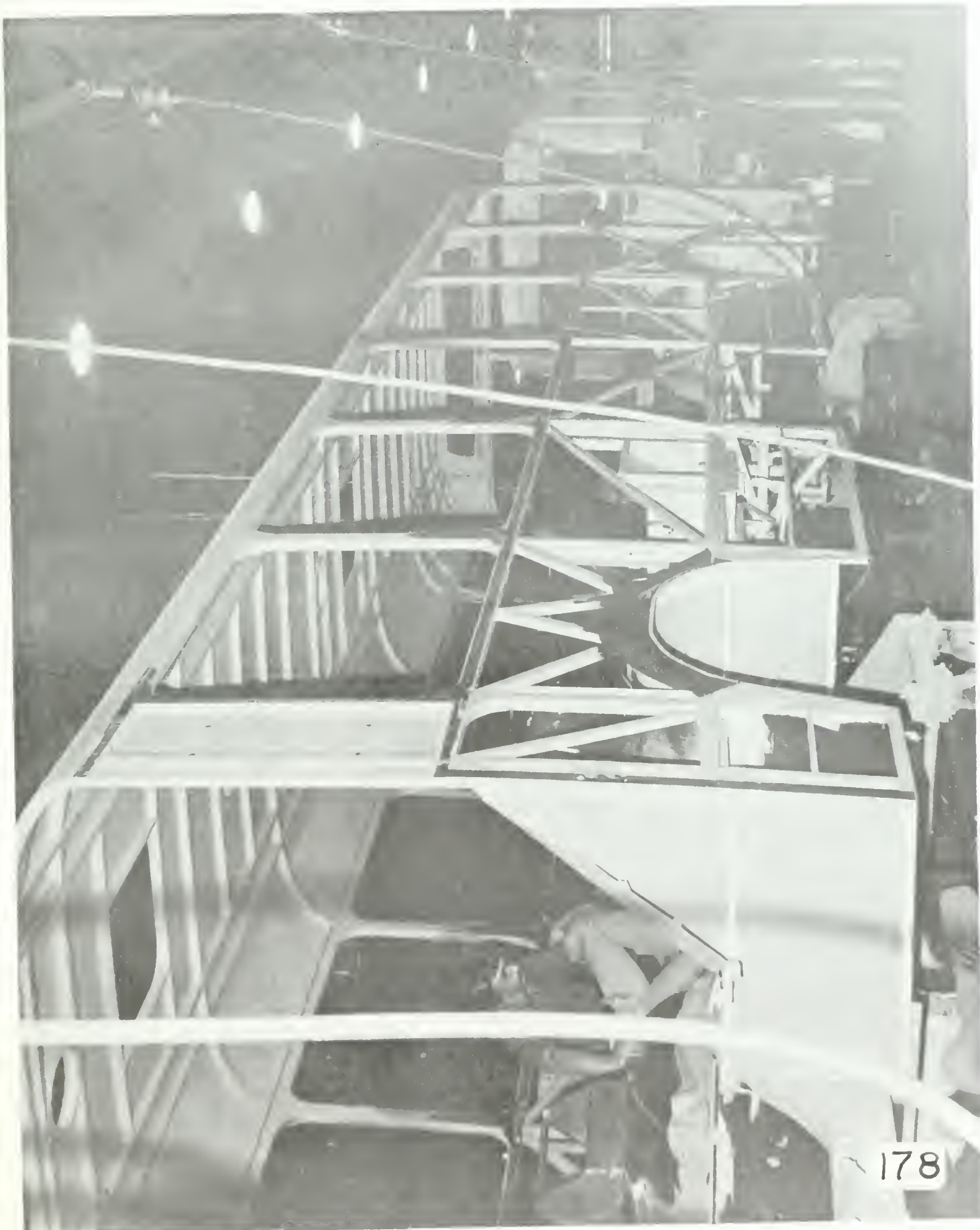


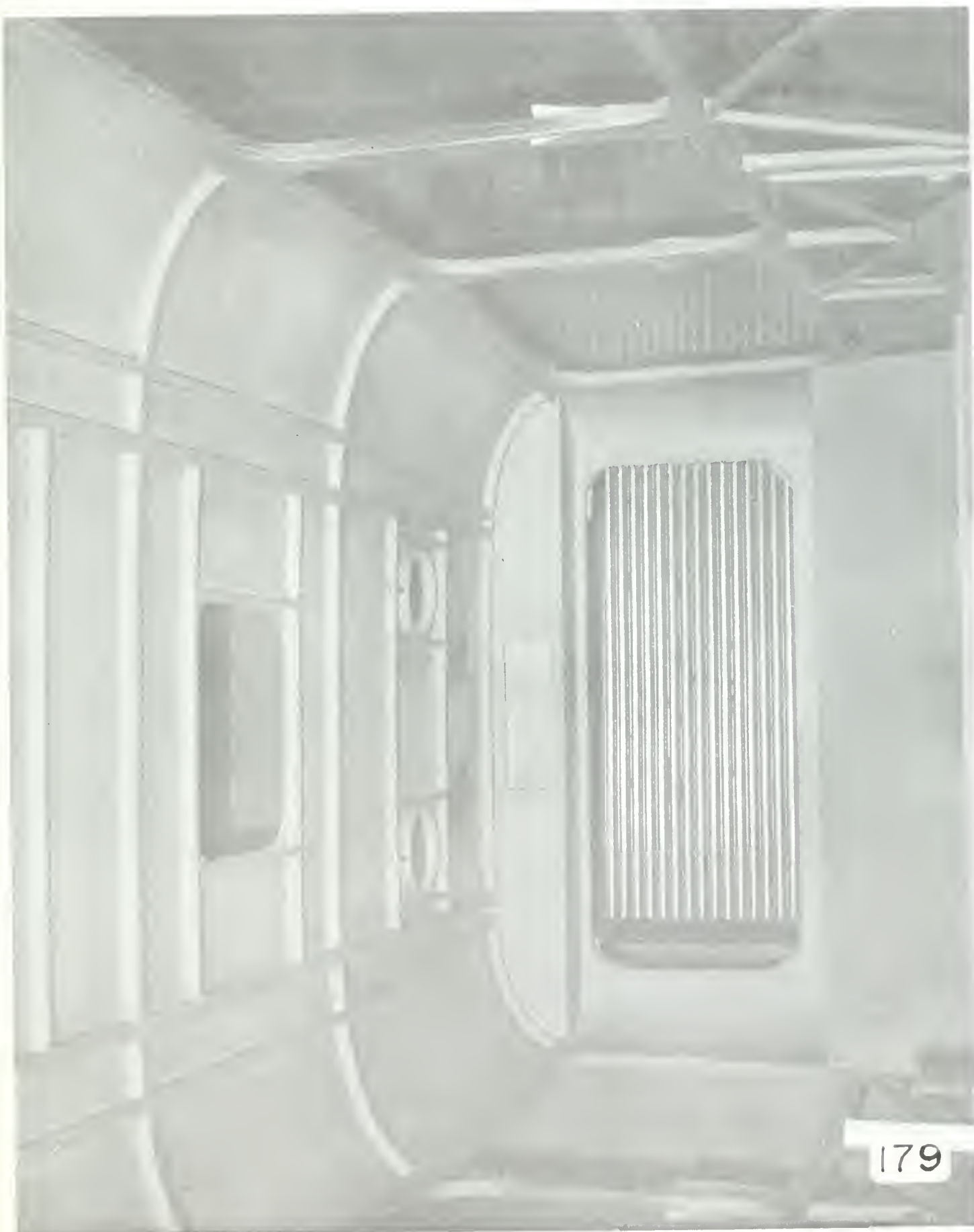










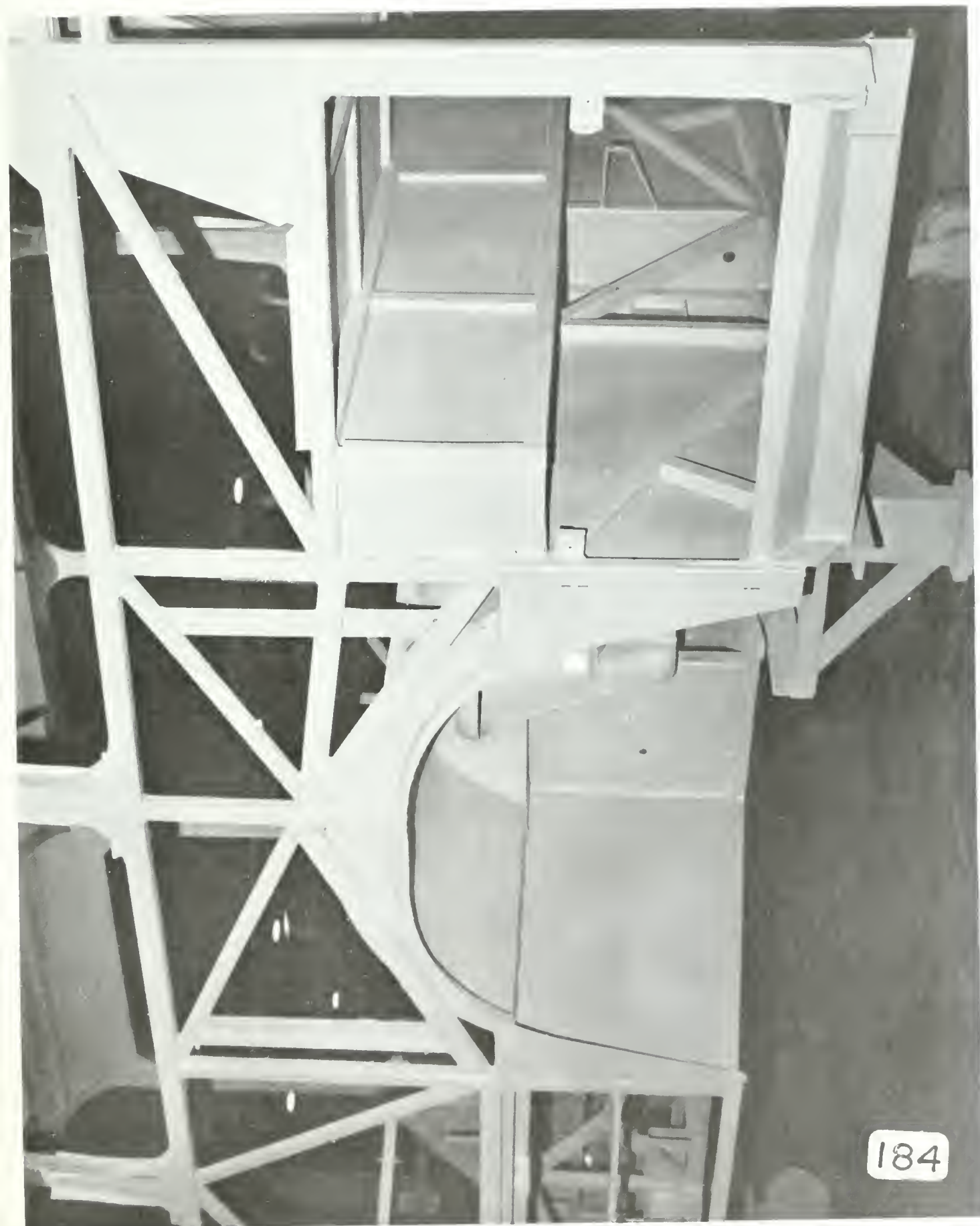




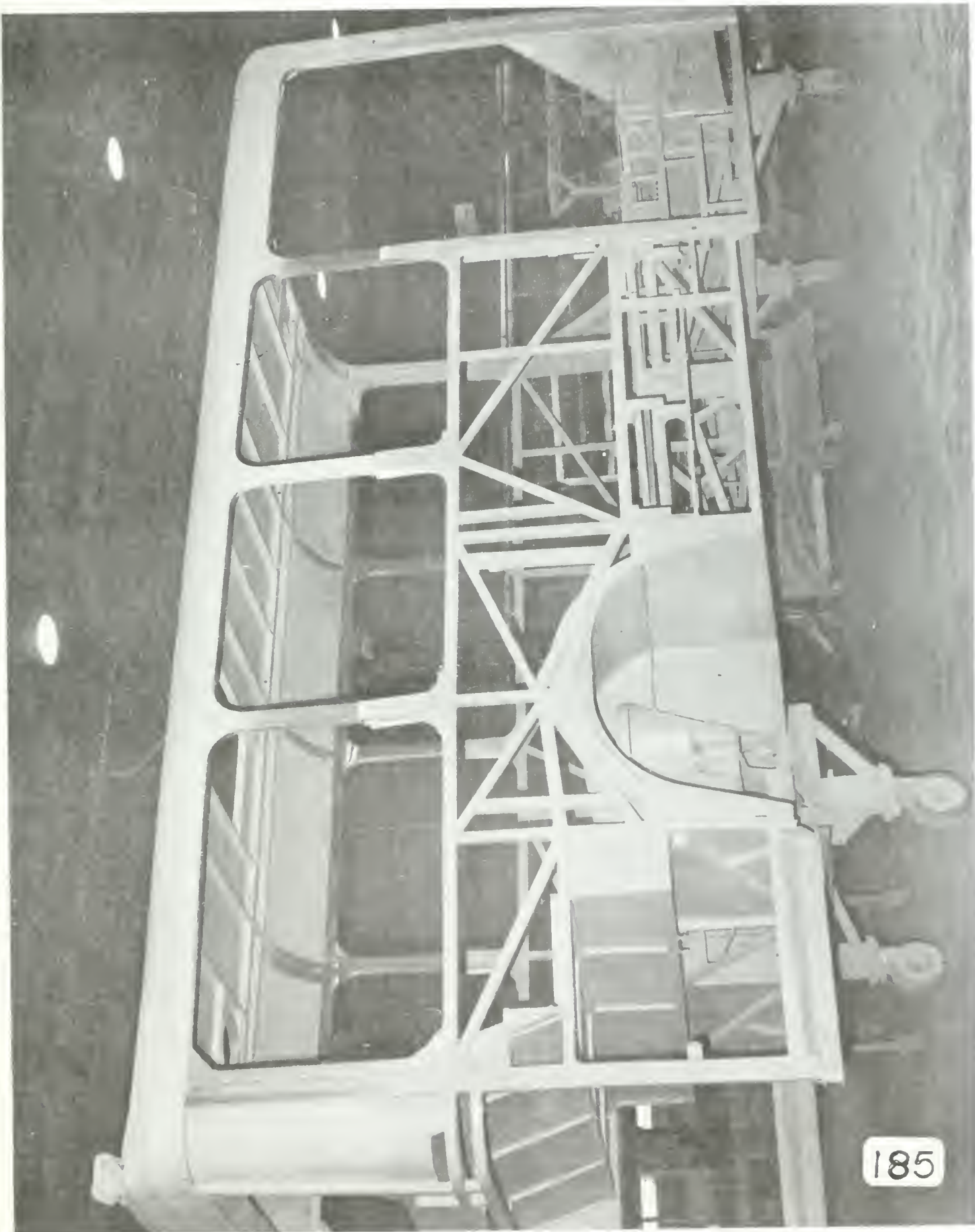


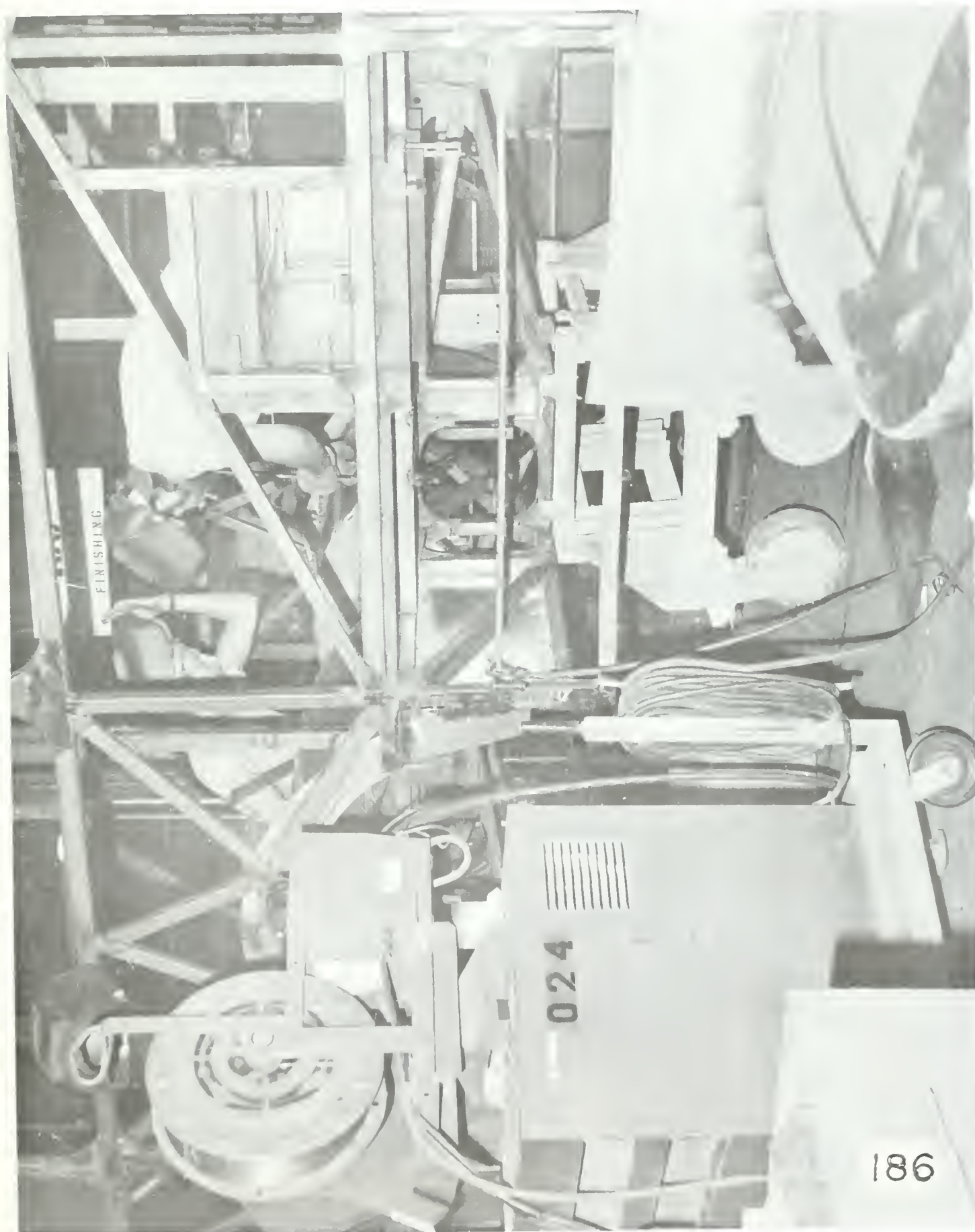






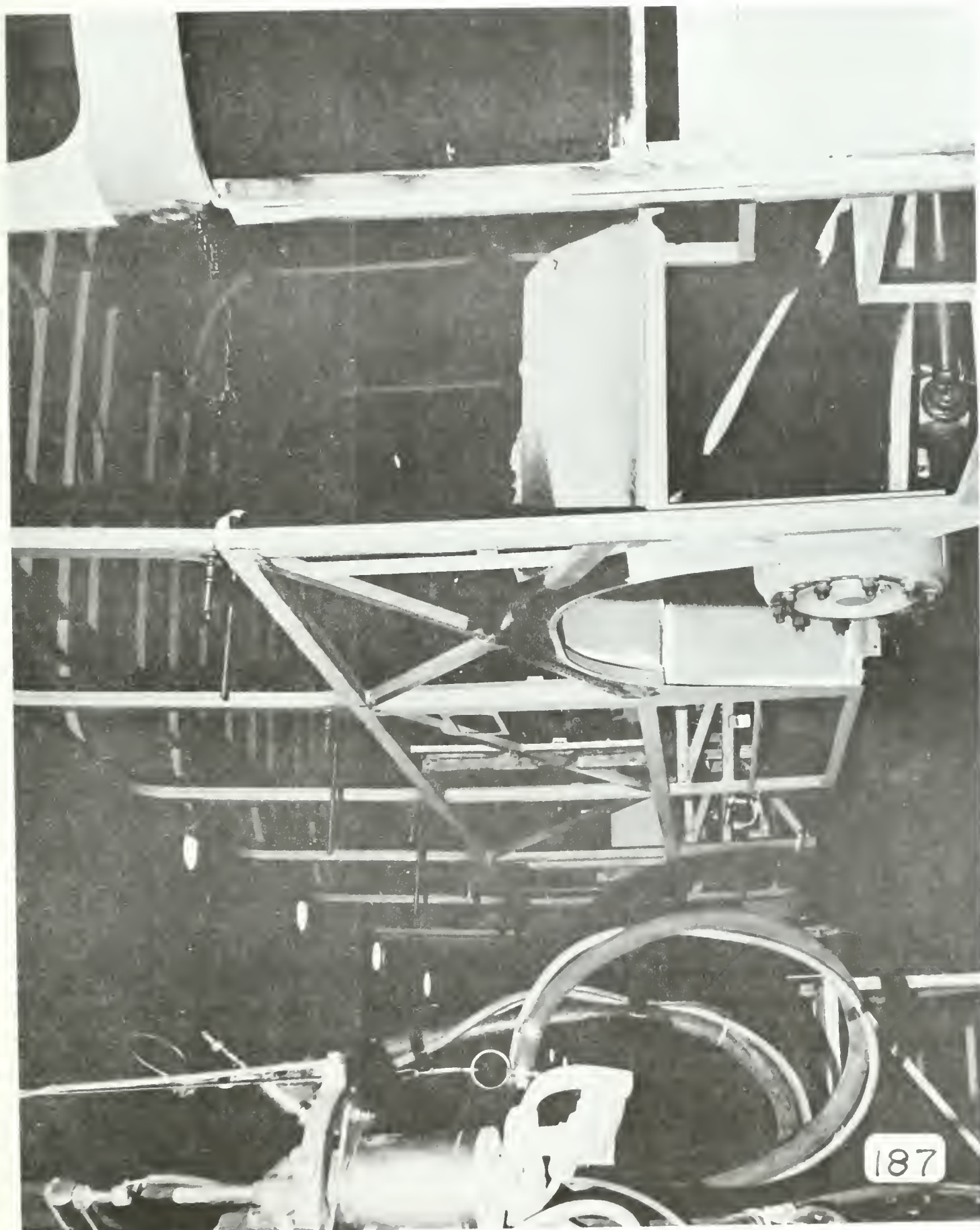
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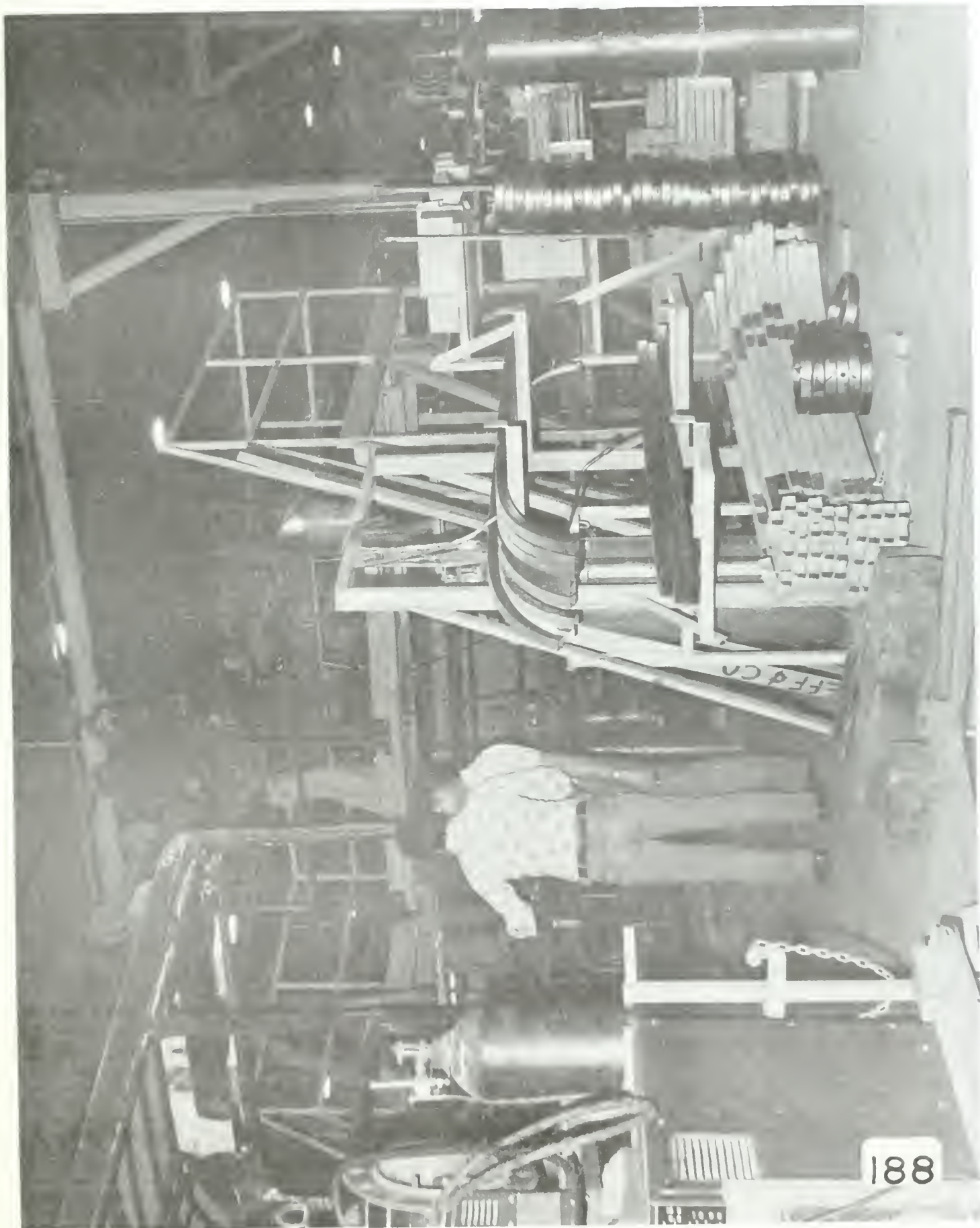


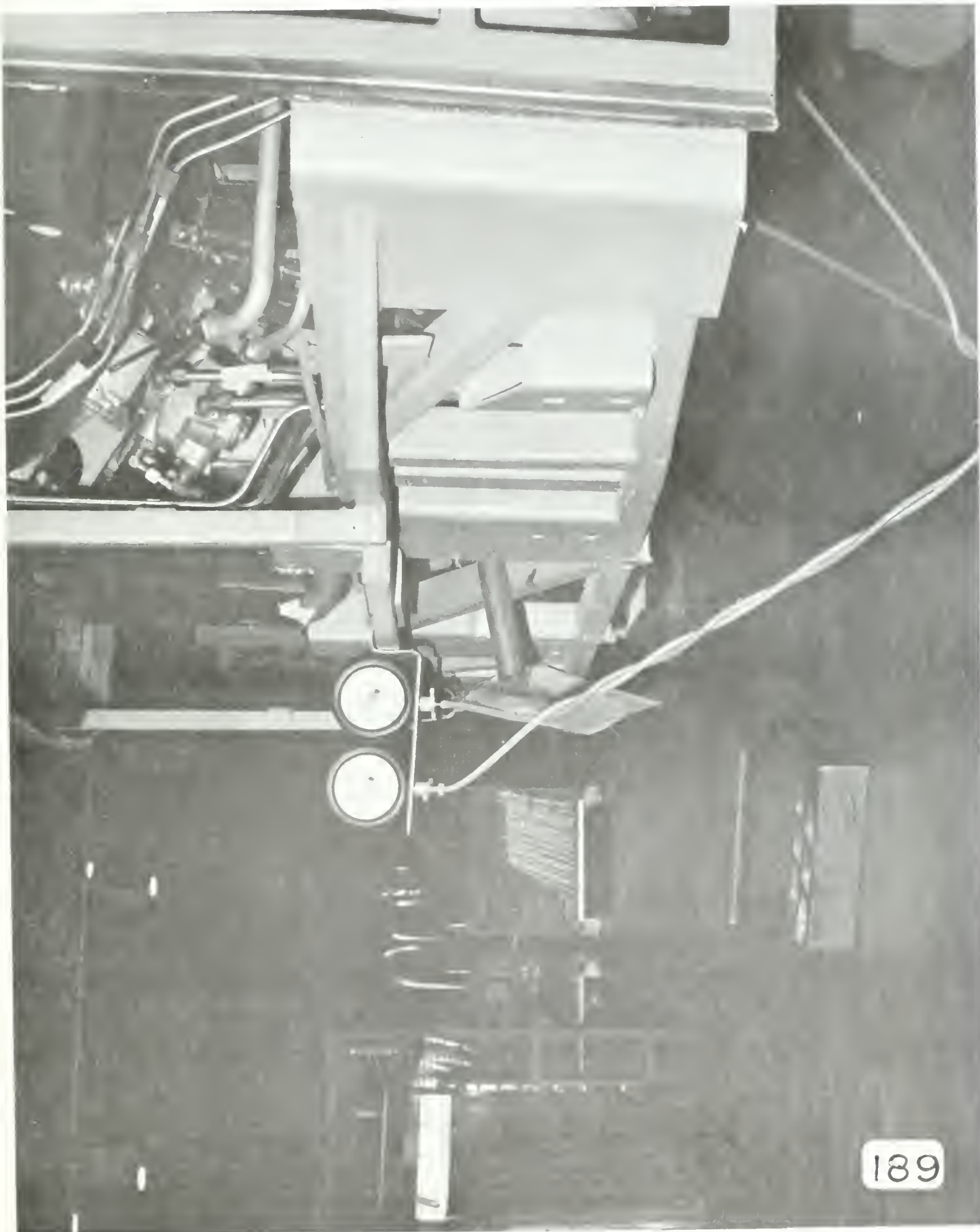


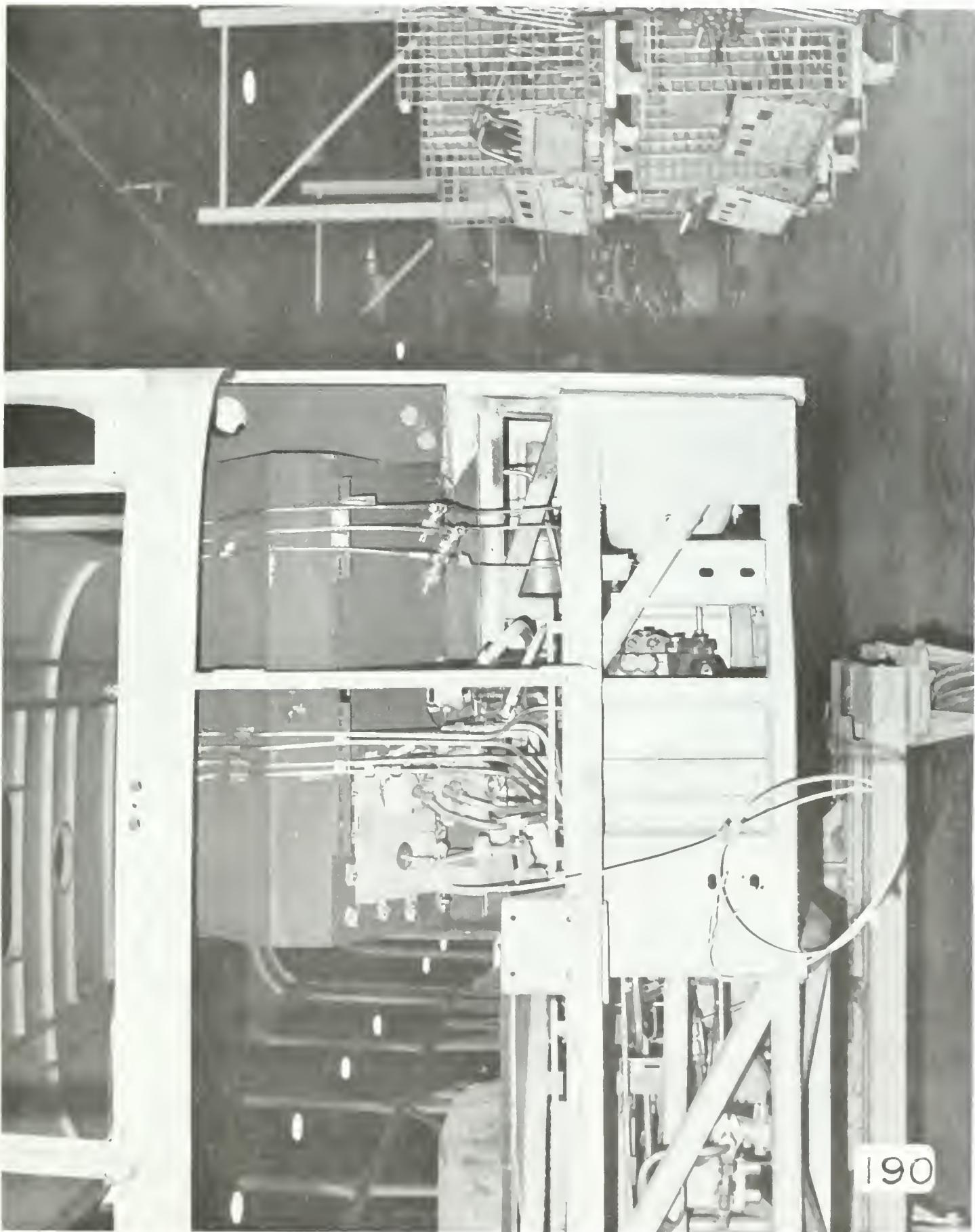
FINISHING

024

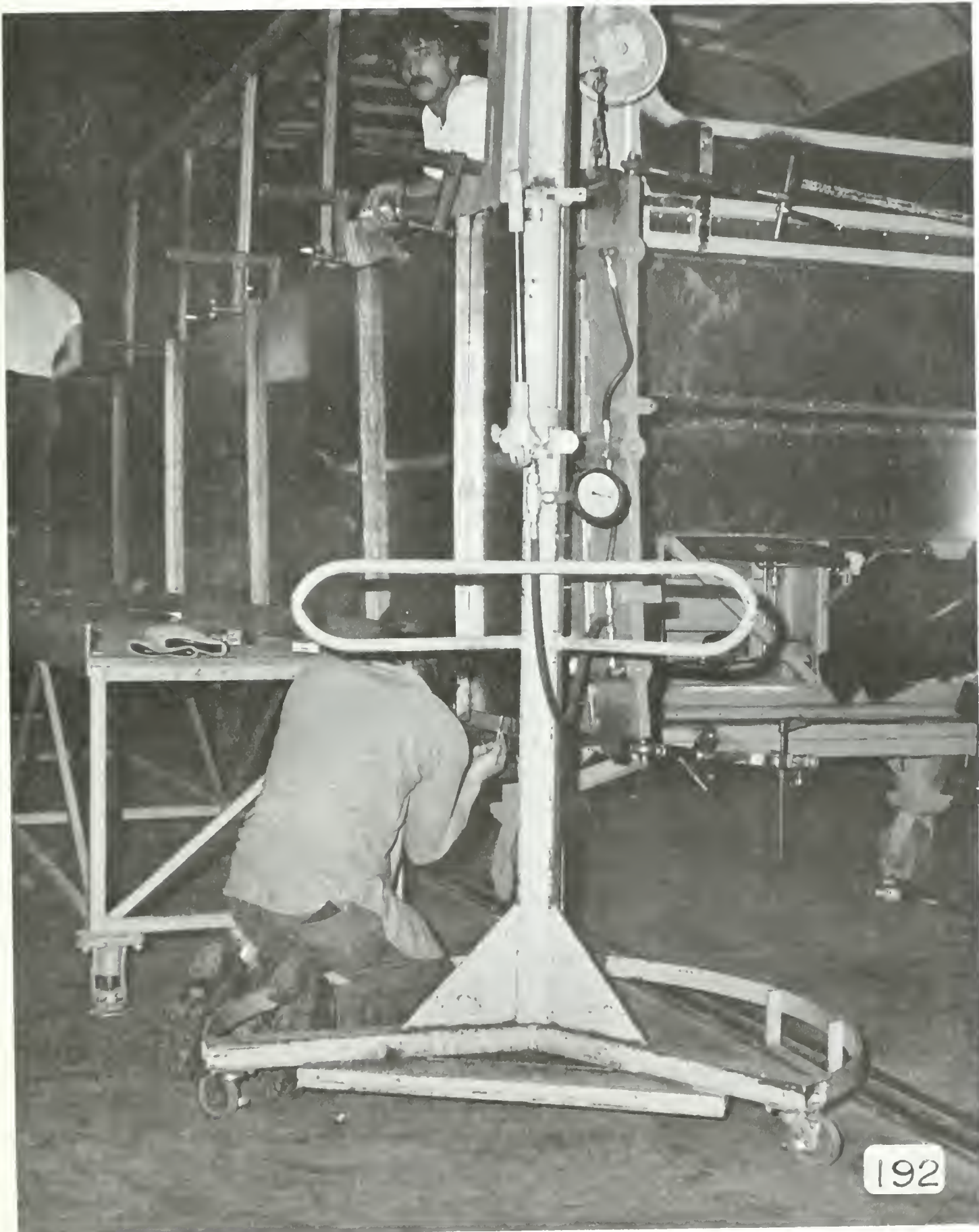


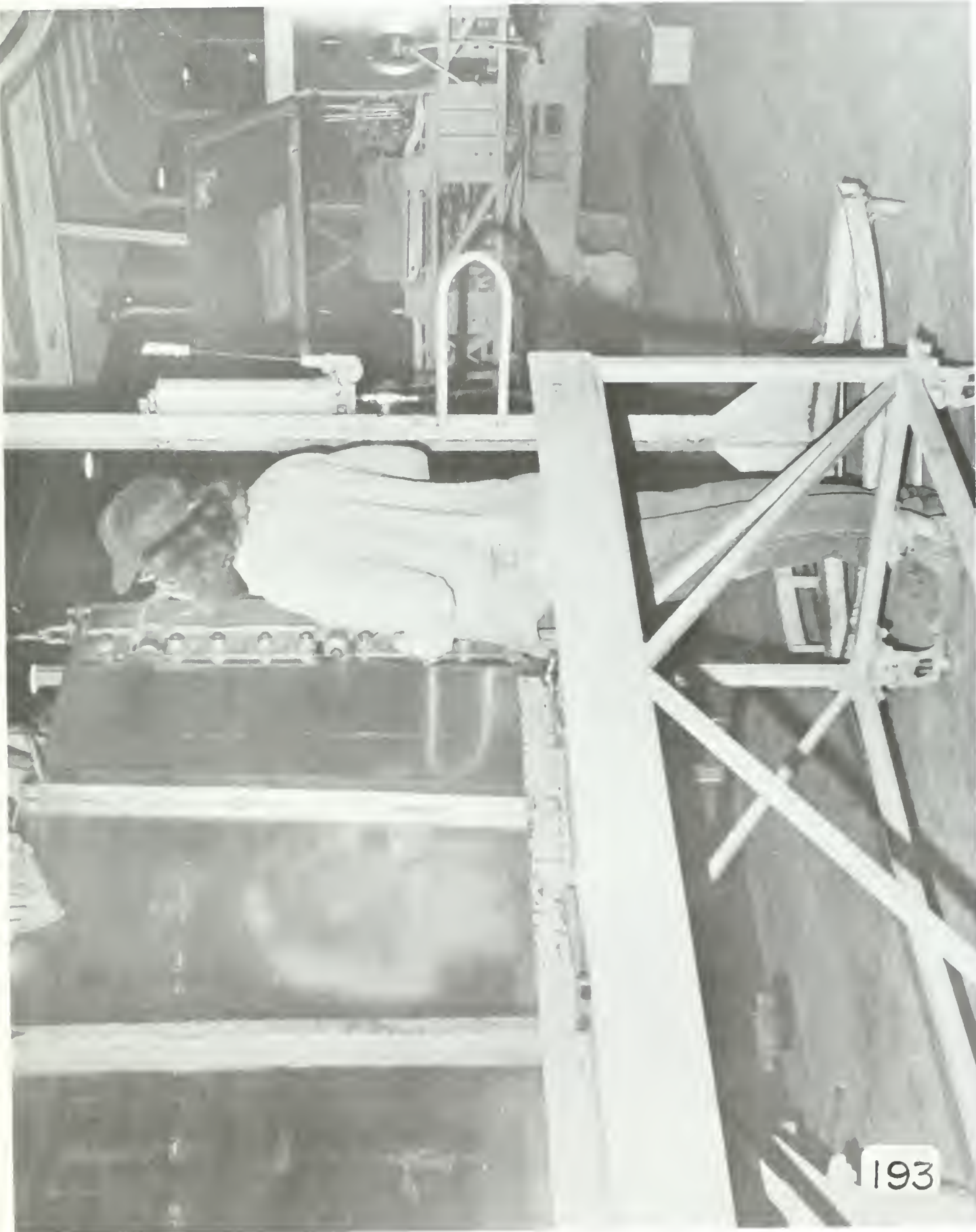


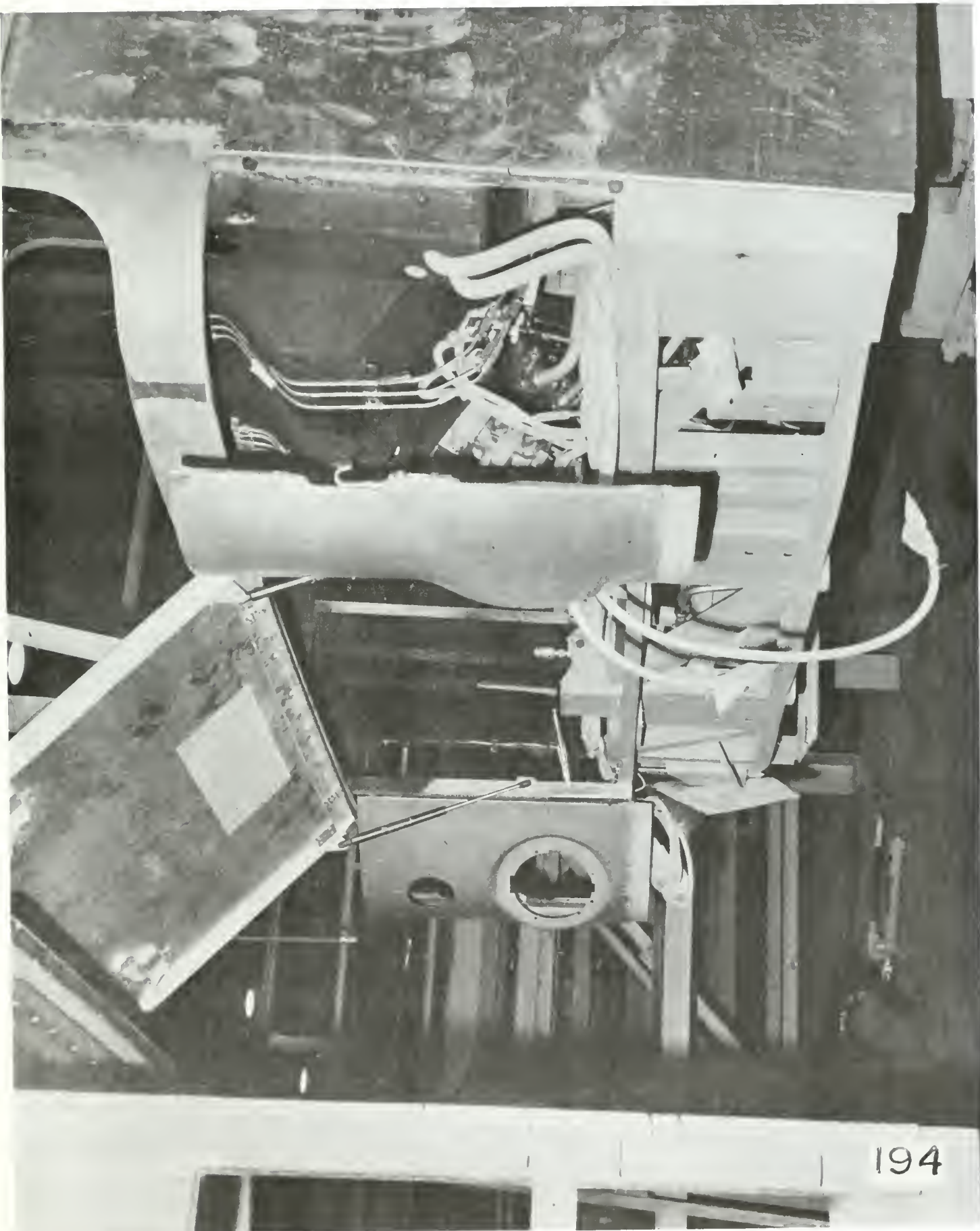








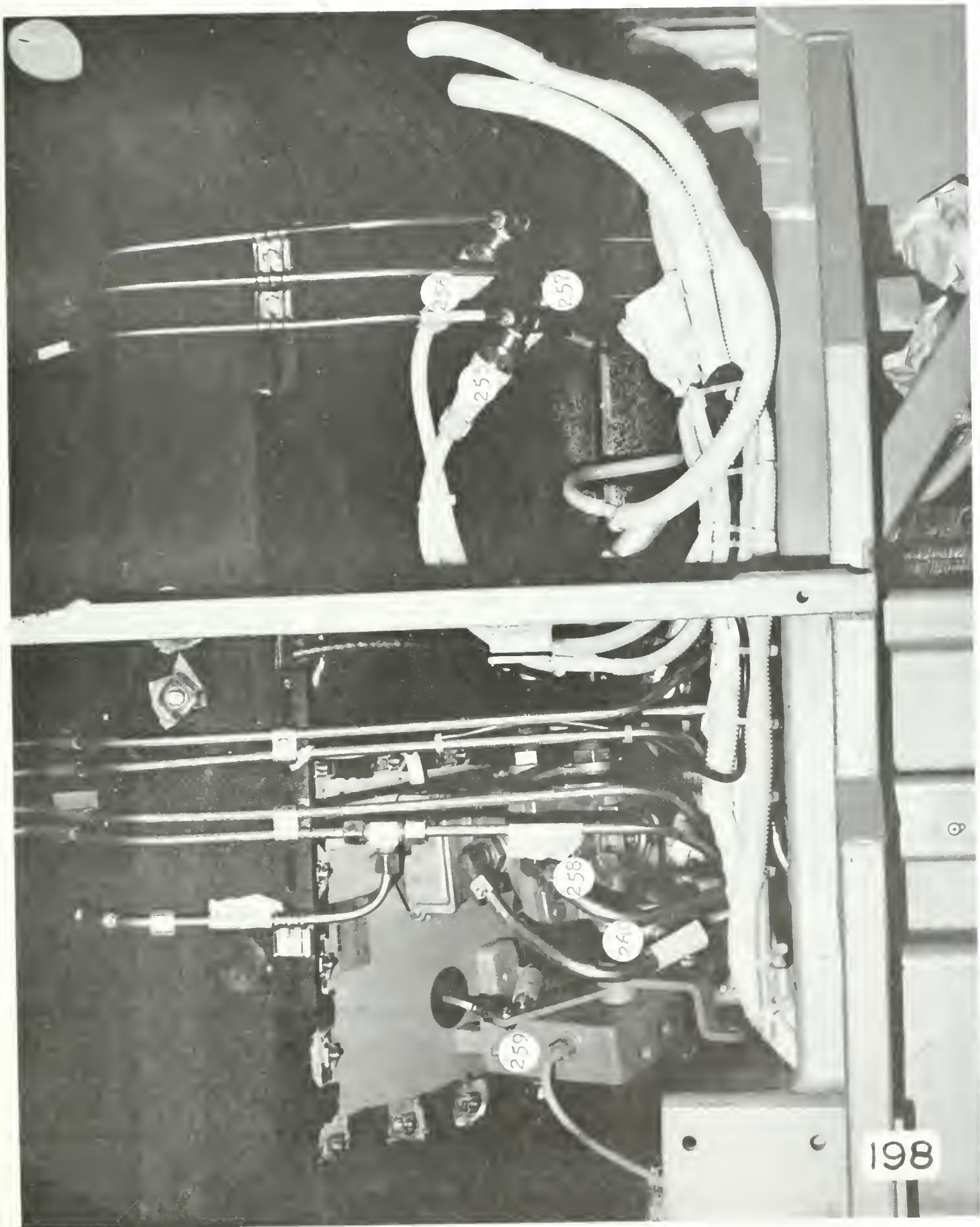


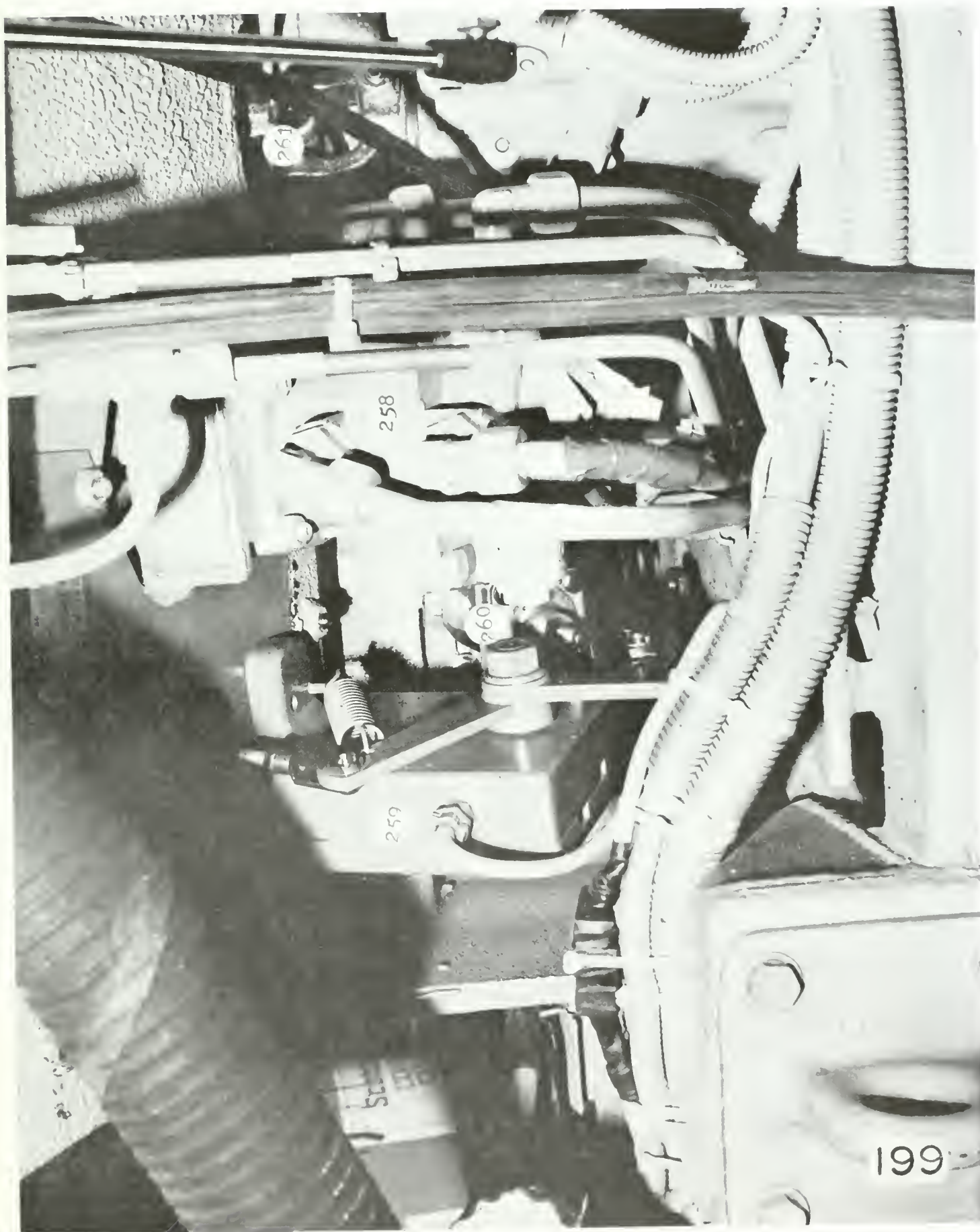


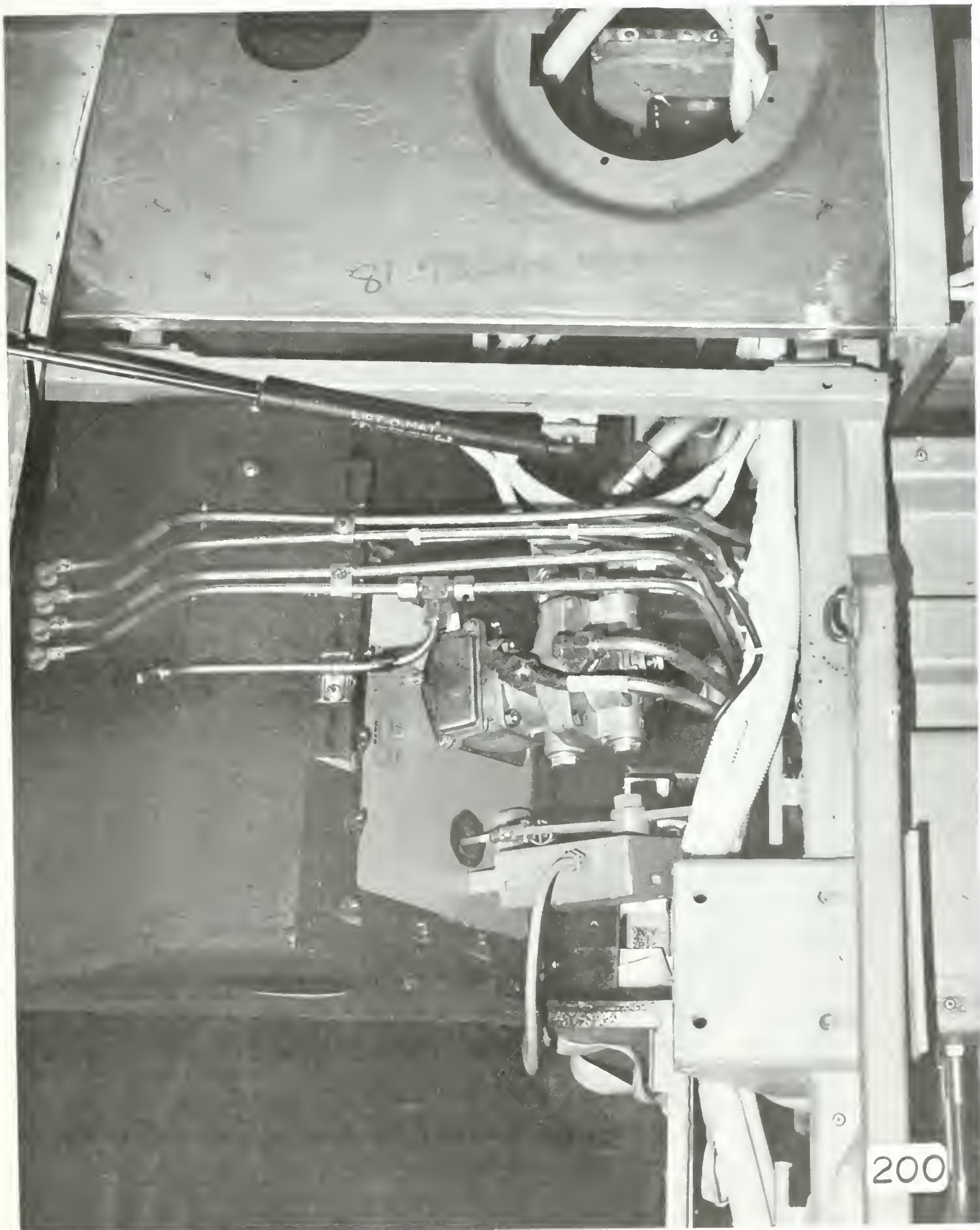


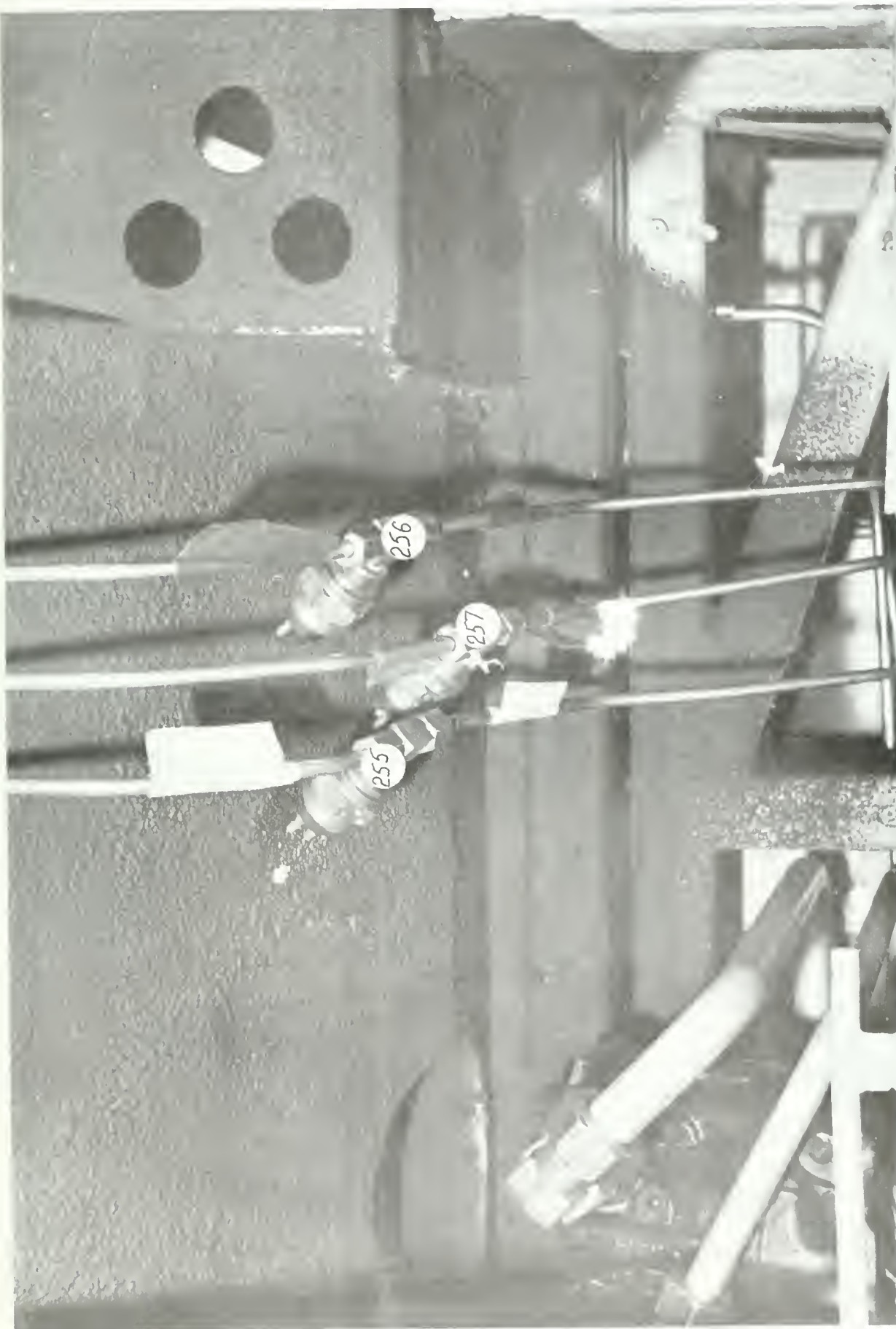




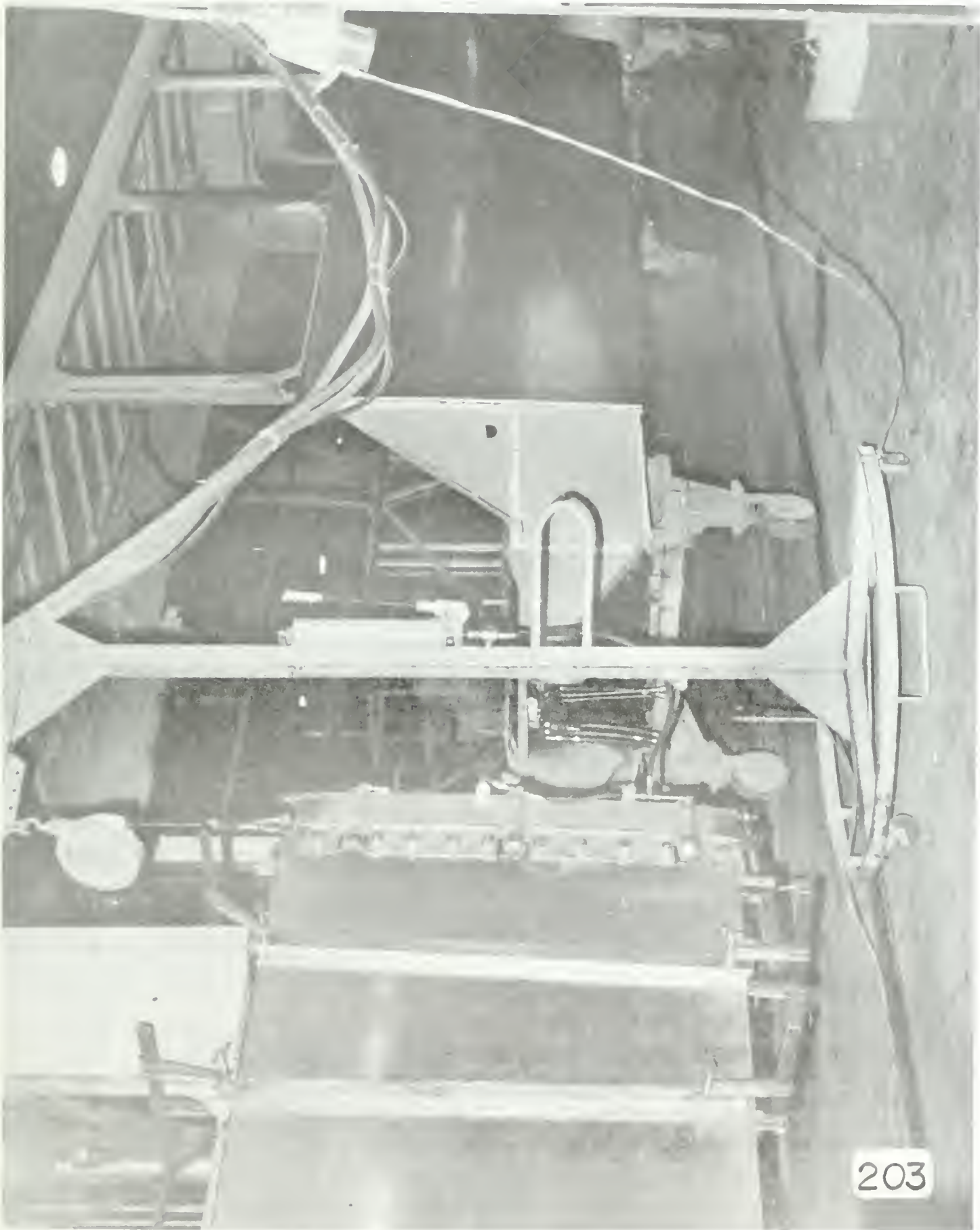




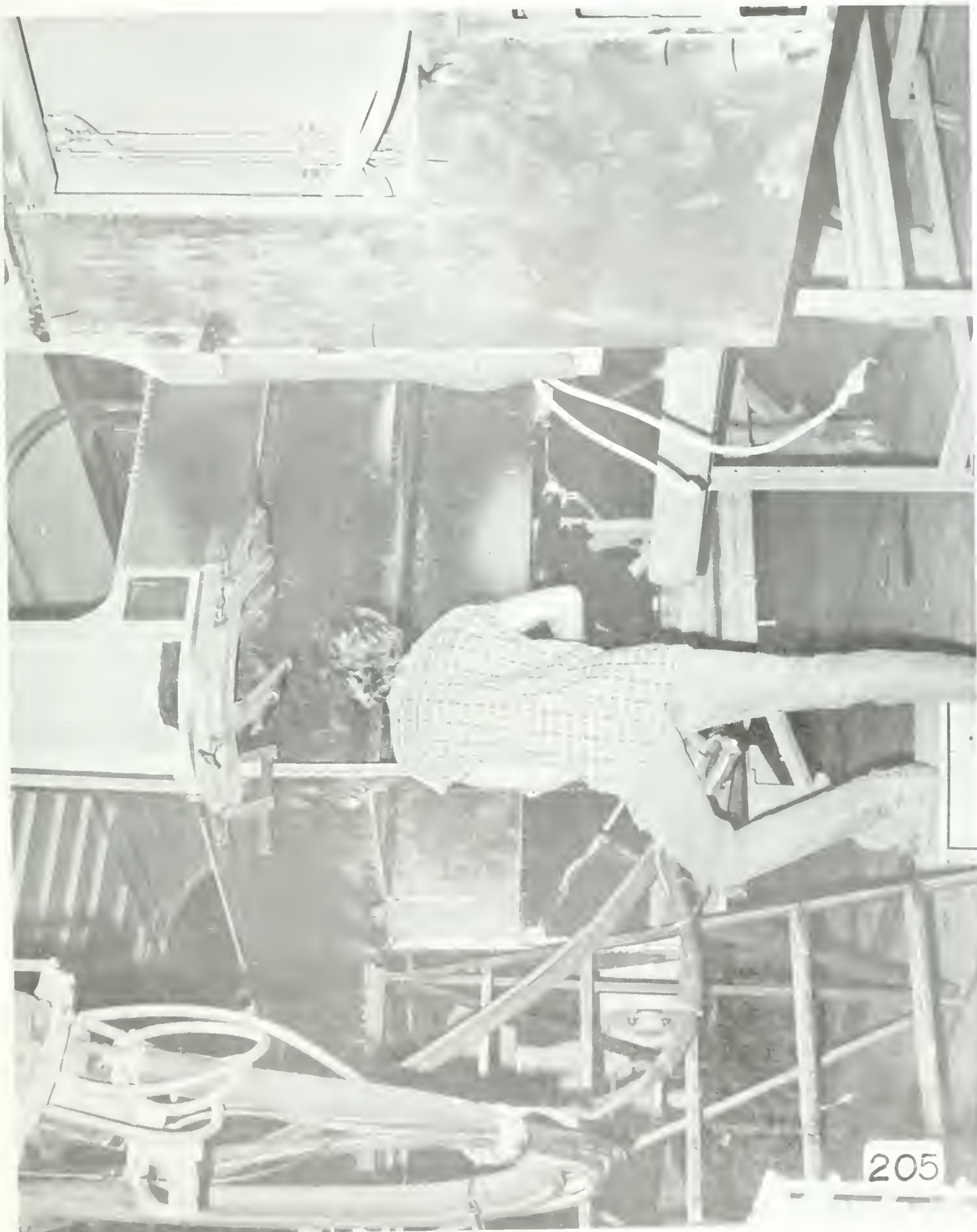












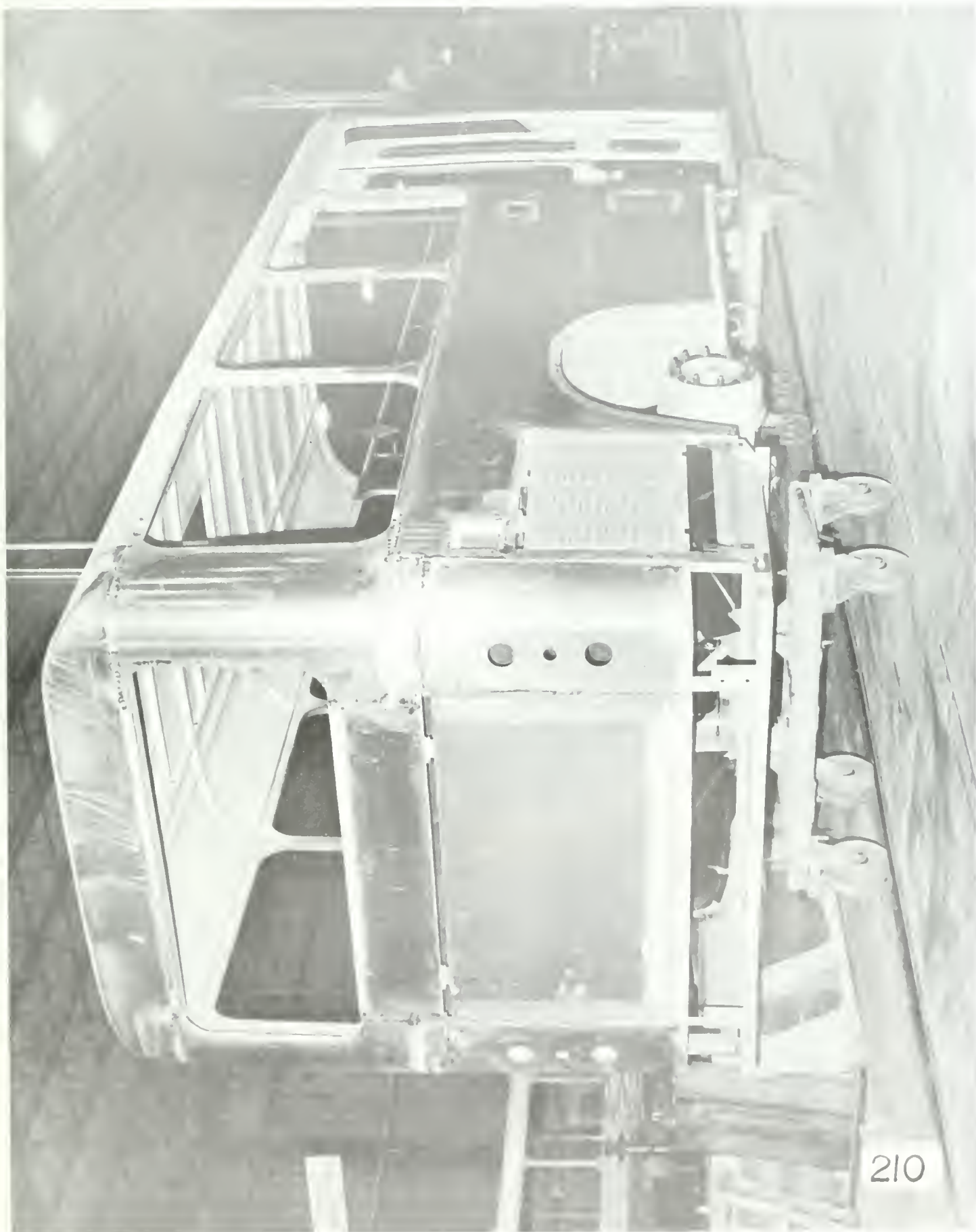






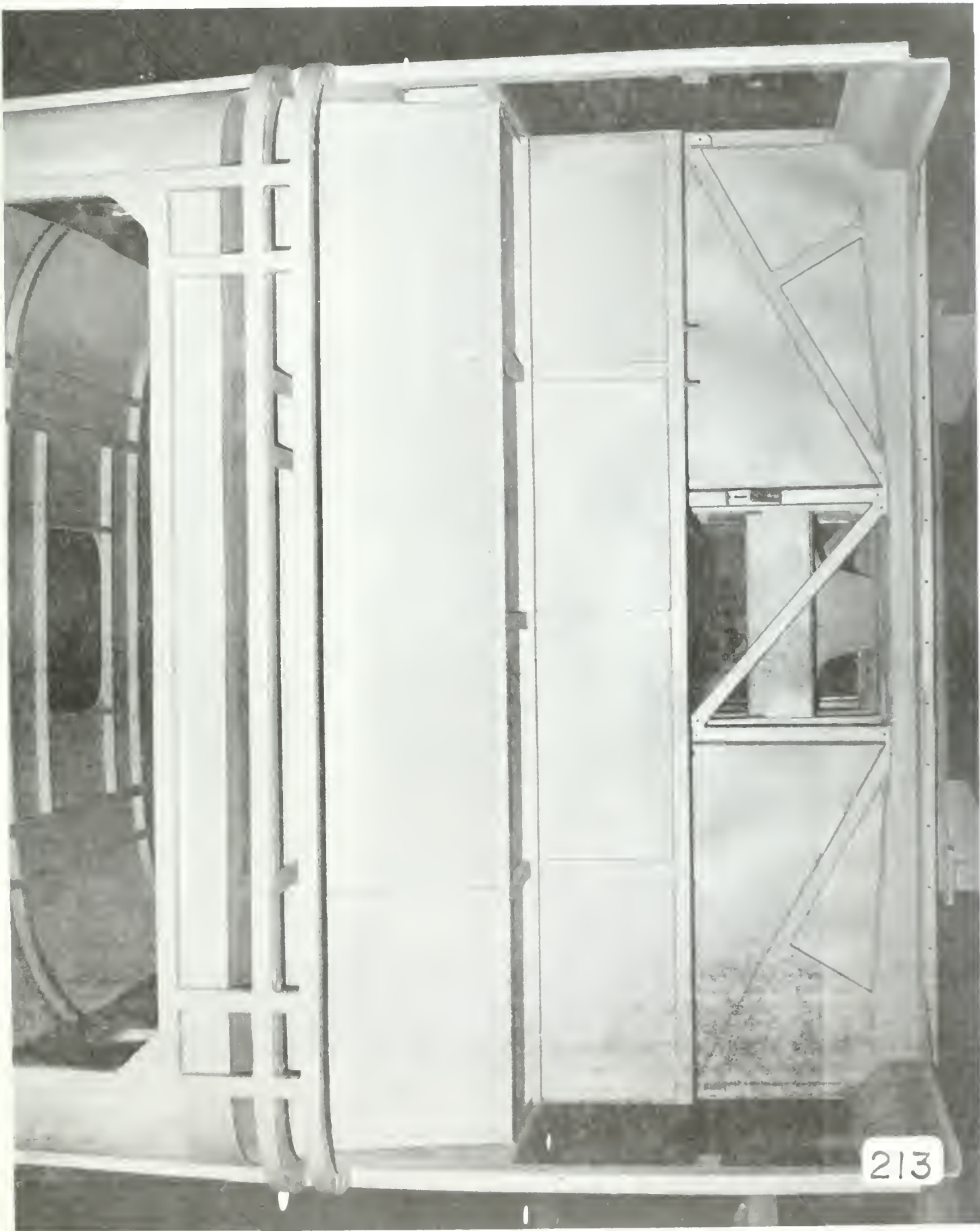
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209



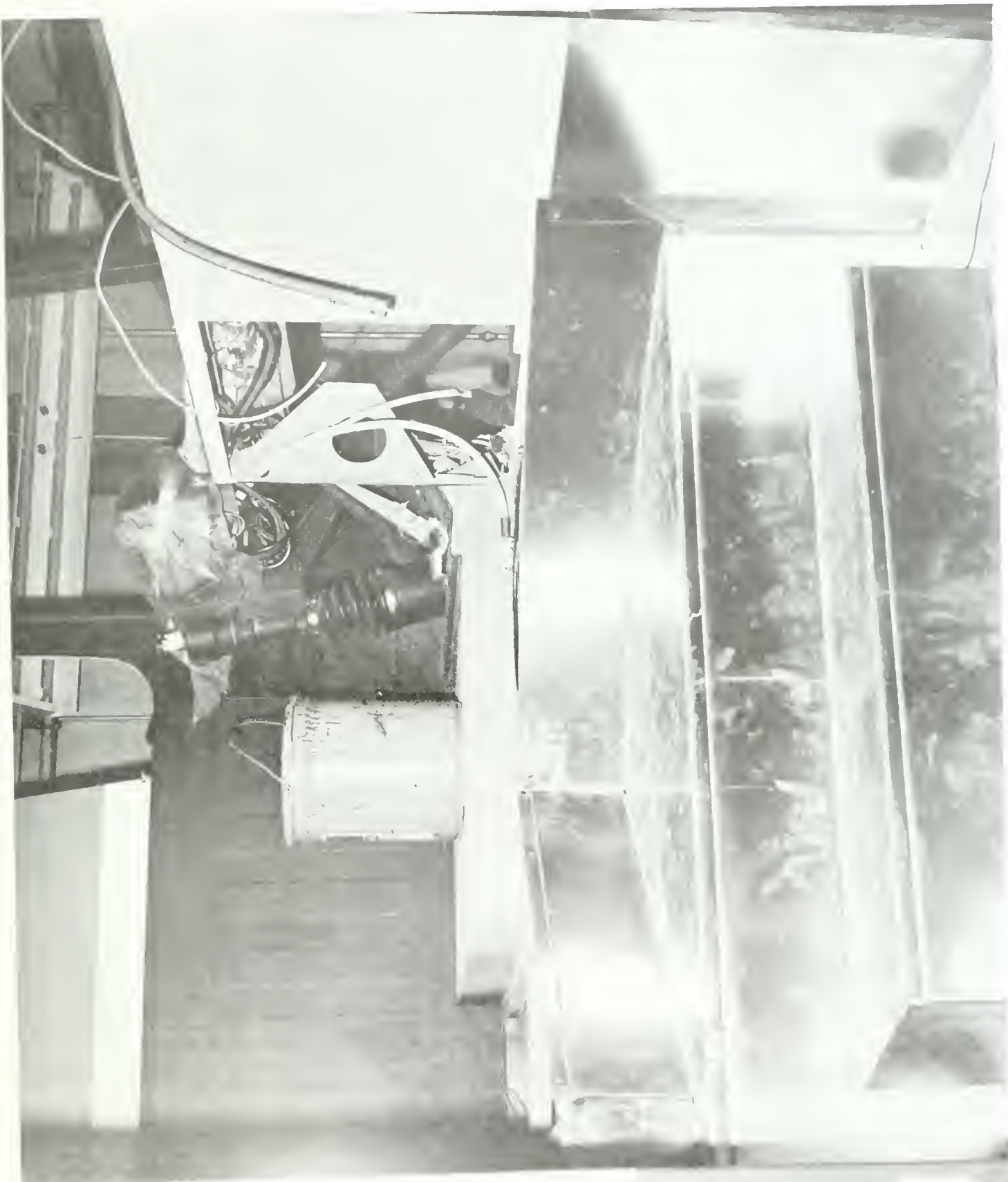






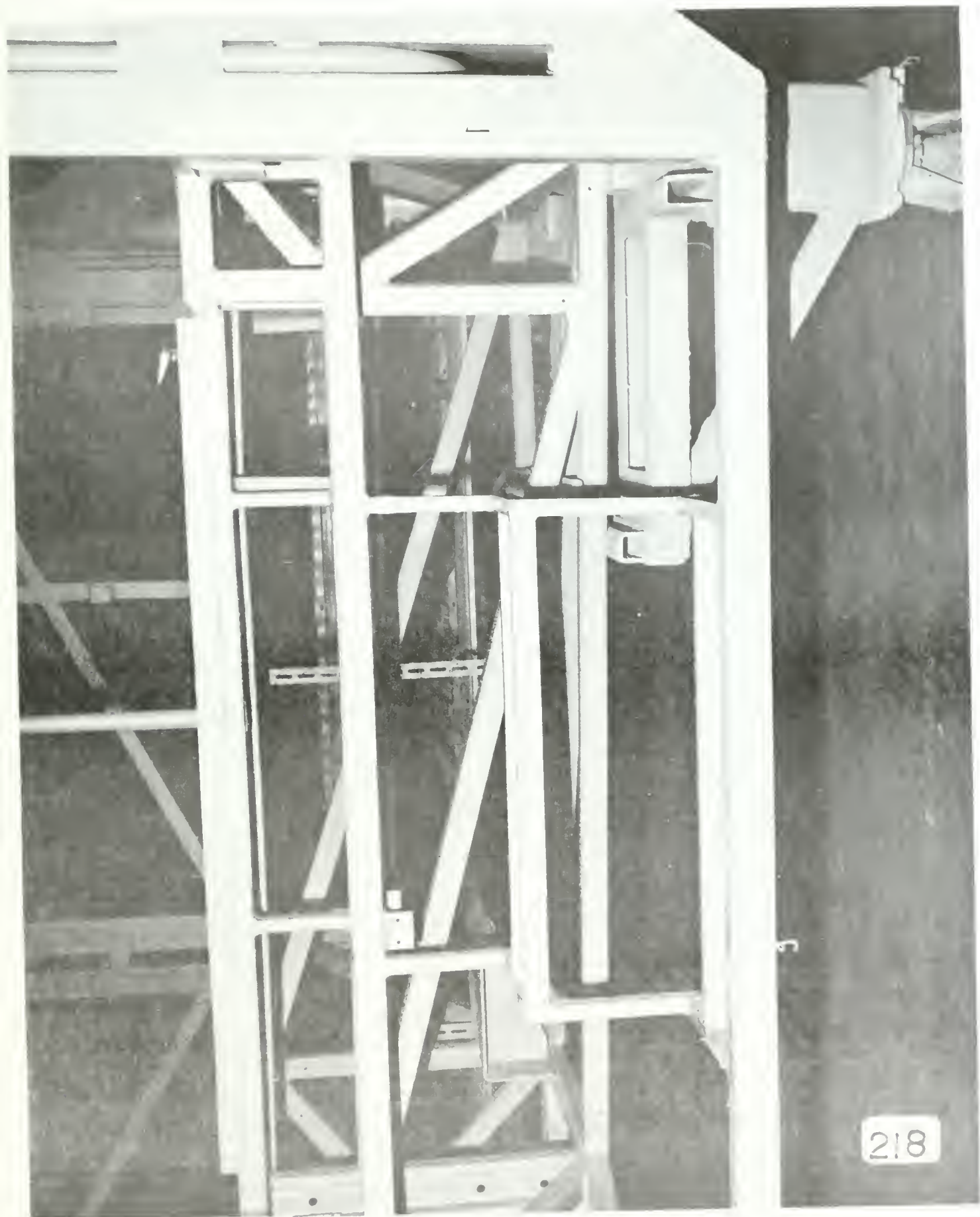




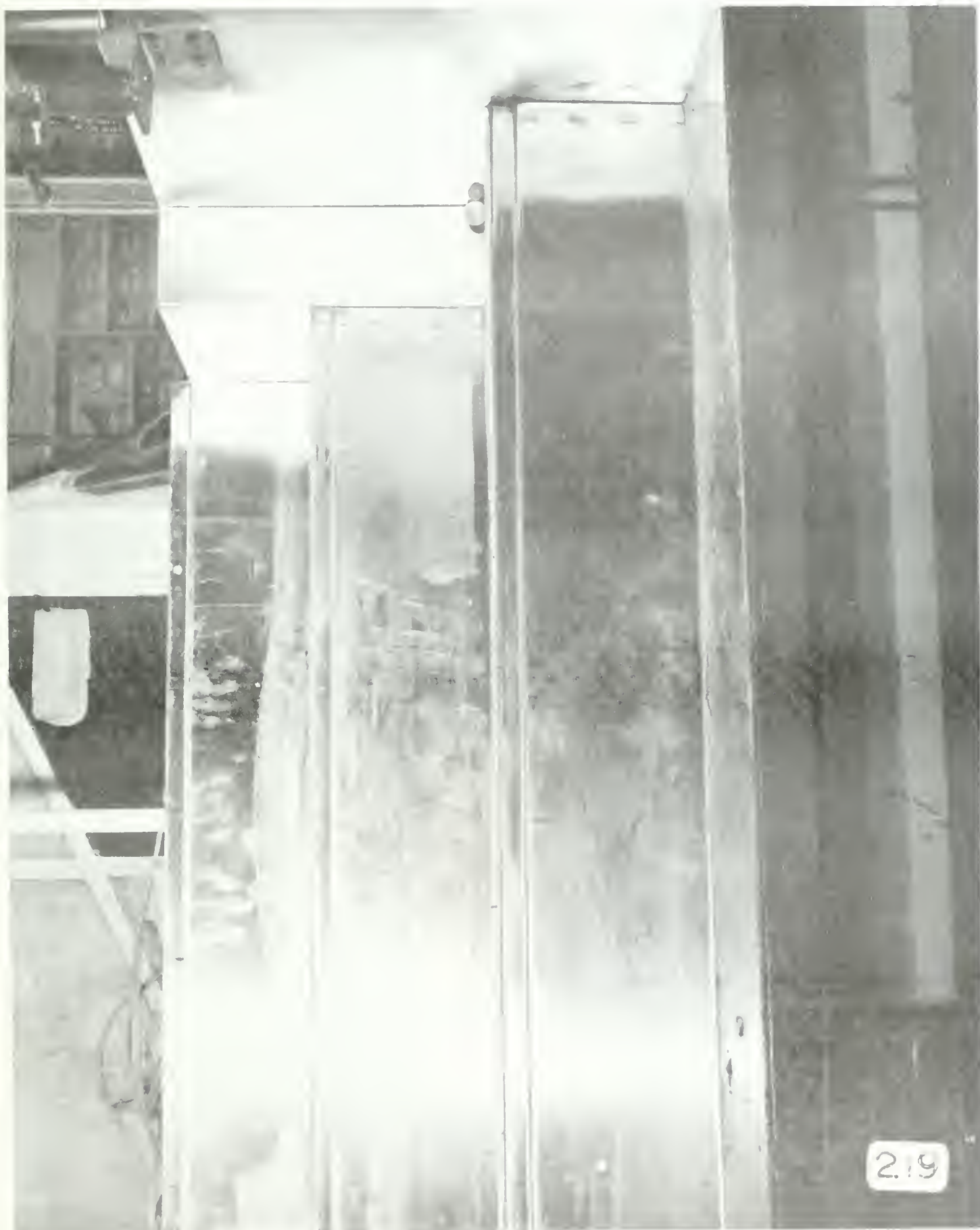




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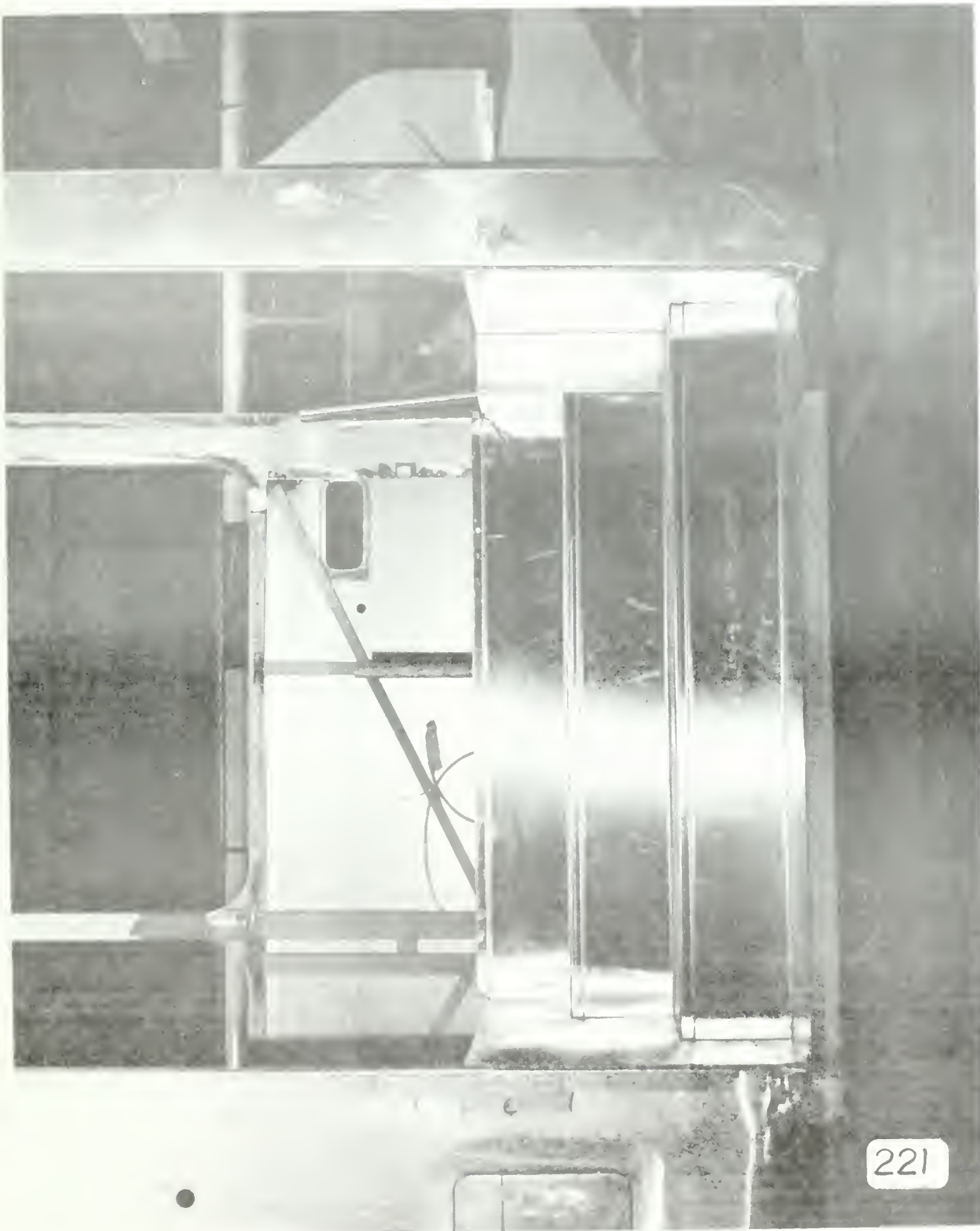


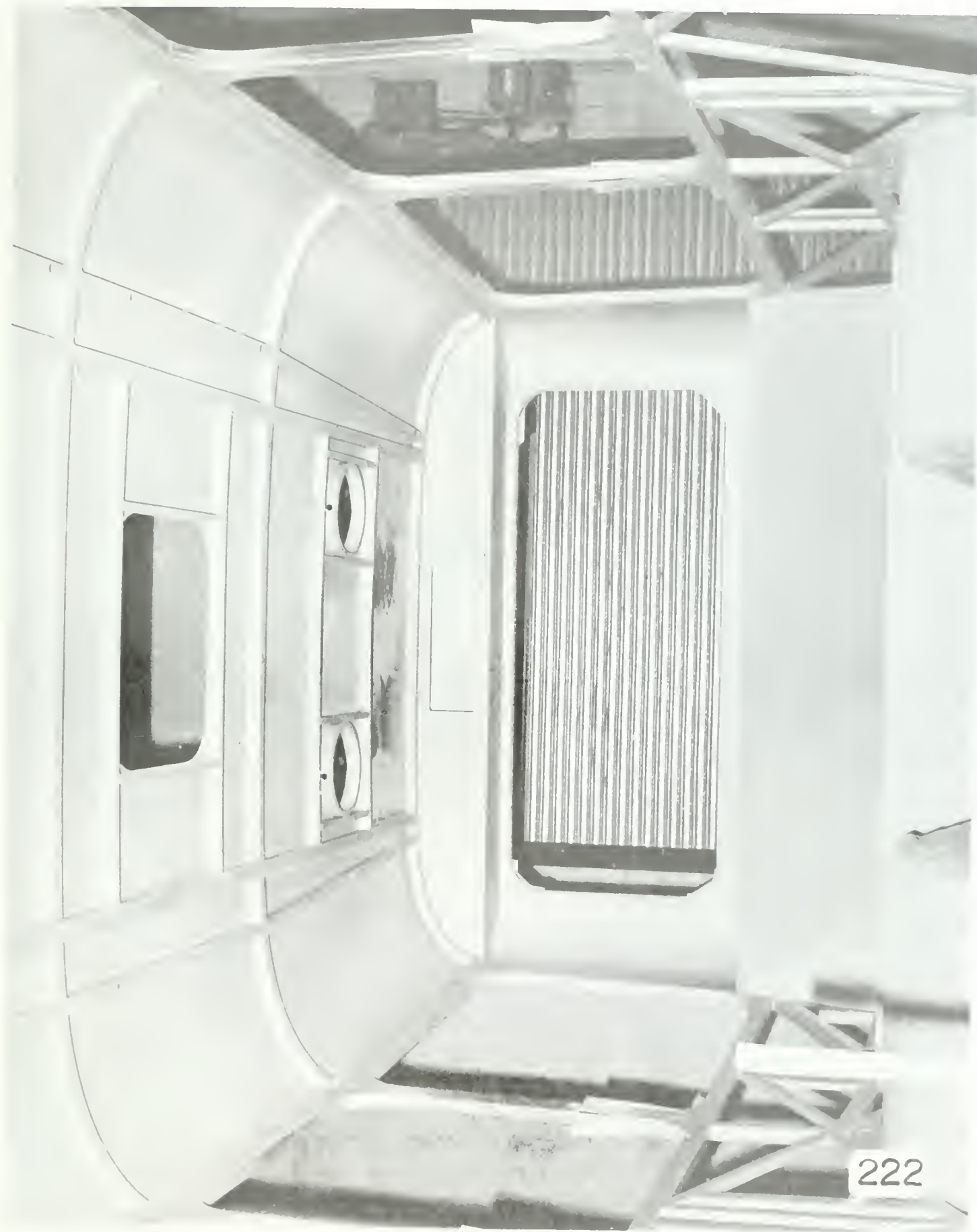
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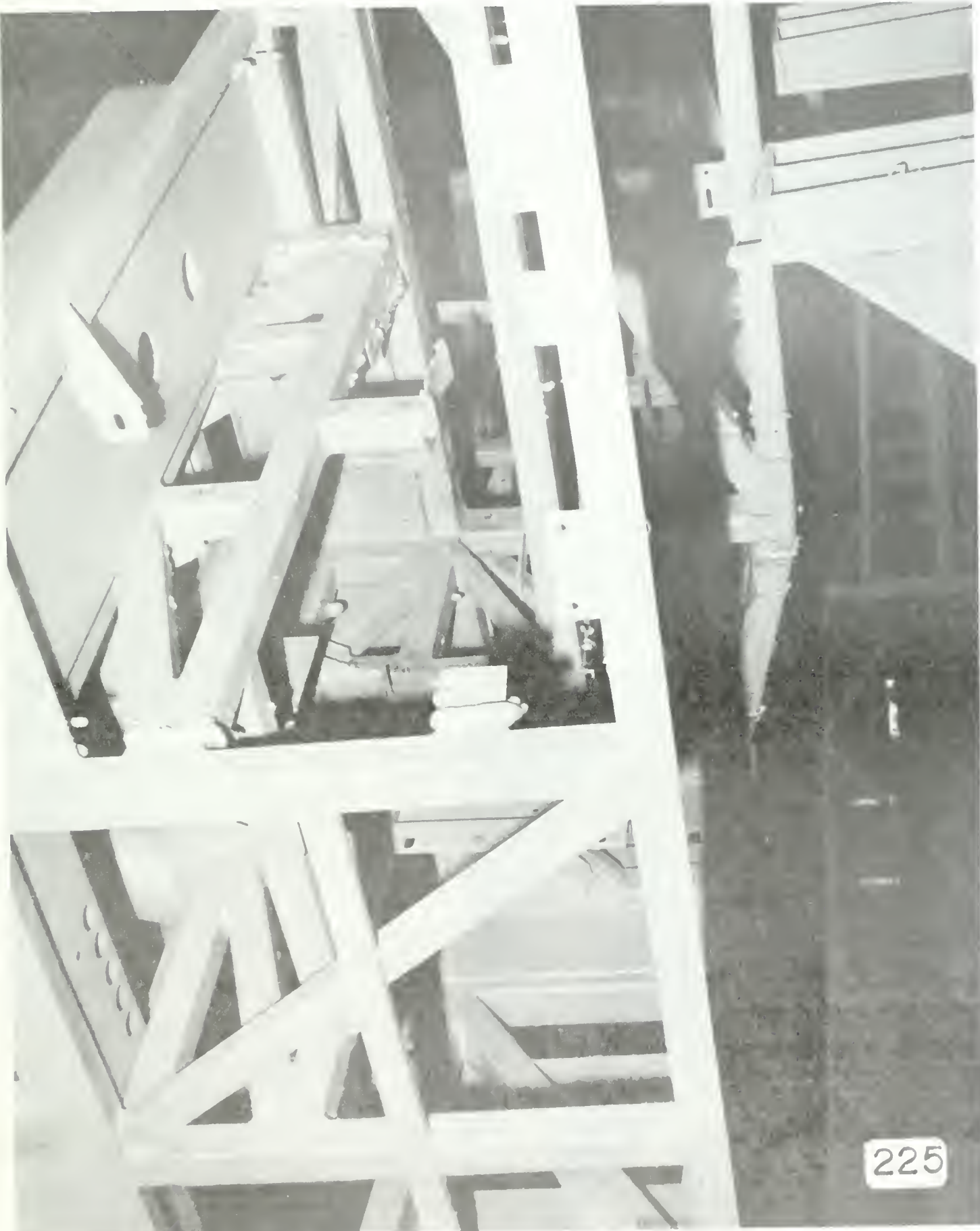
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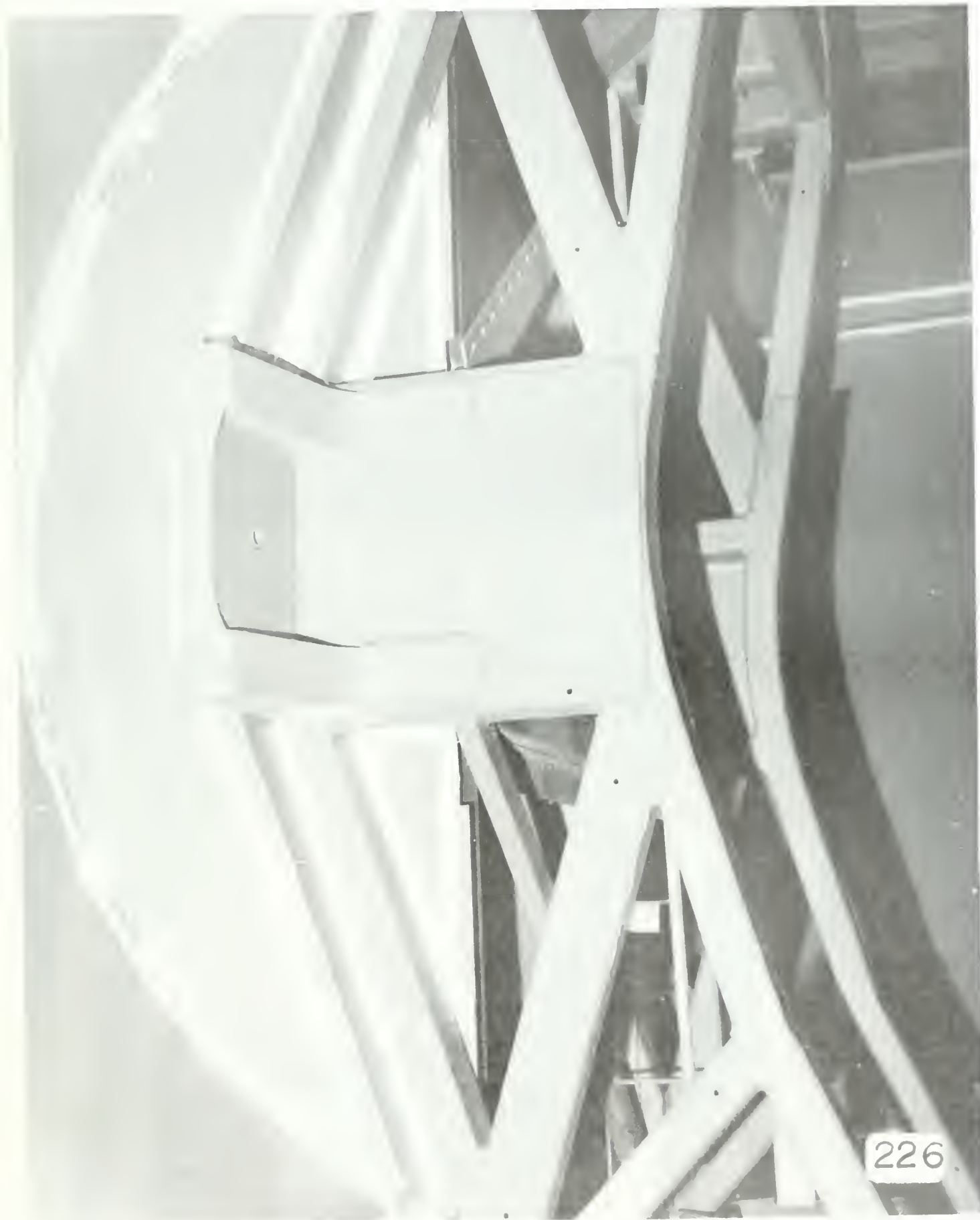


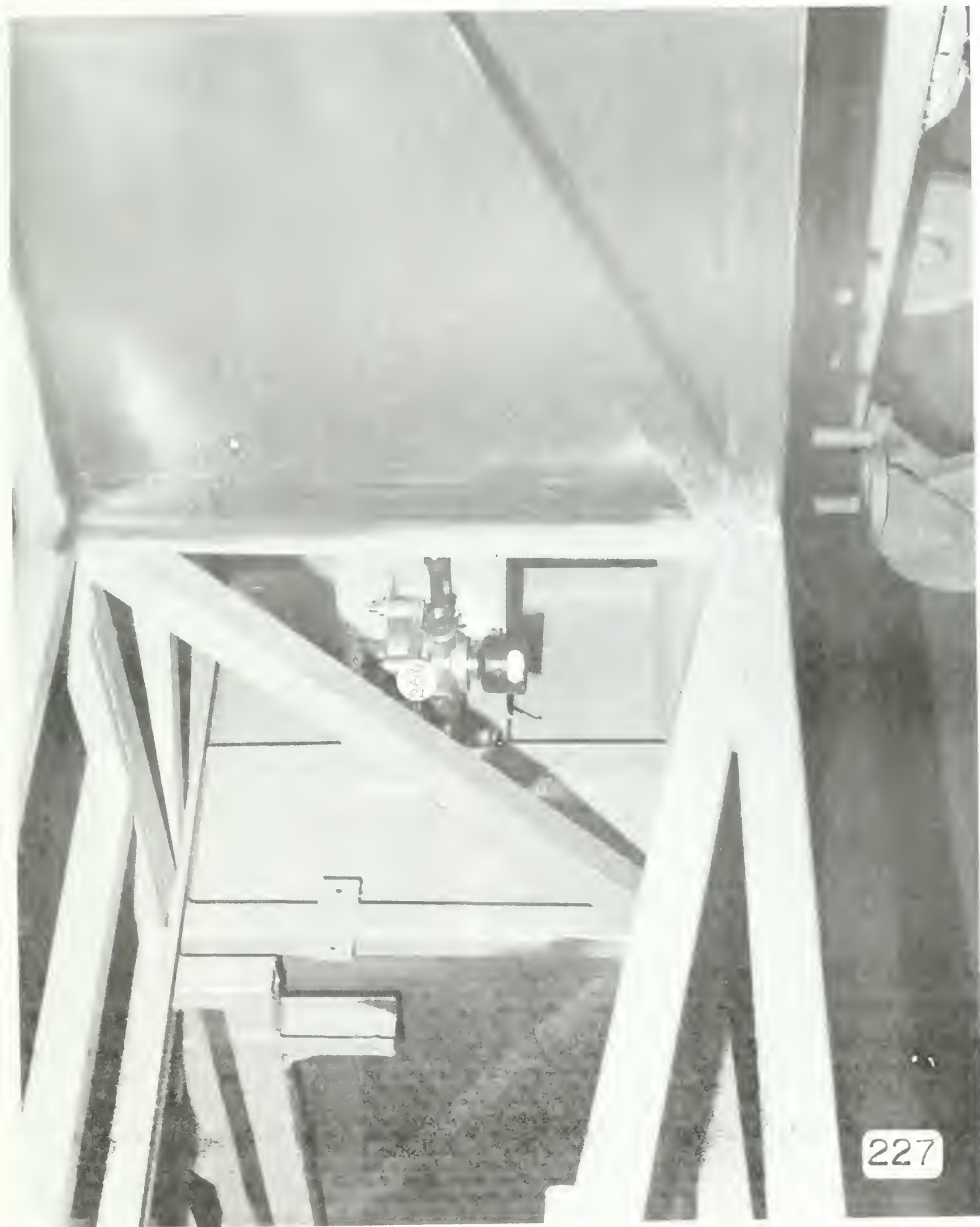




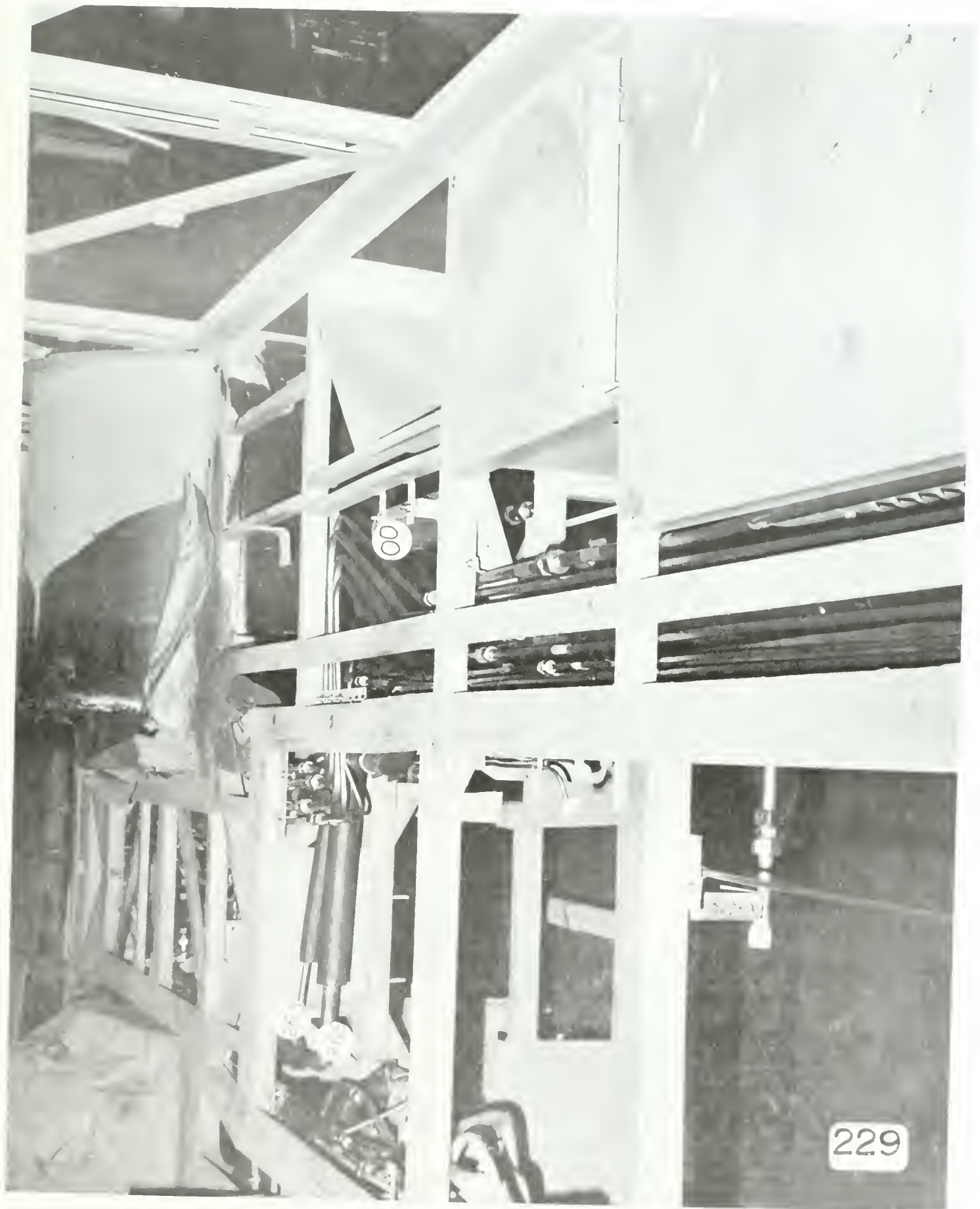






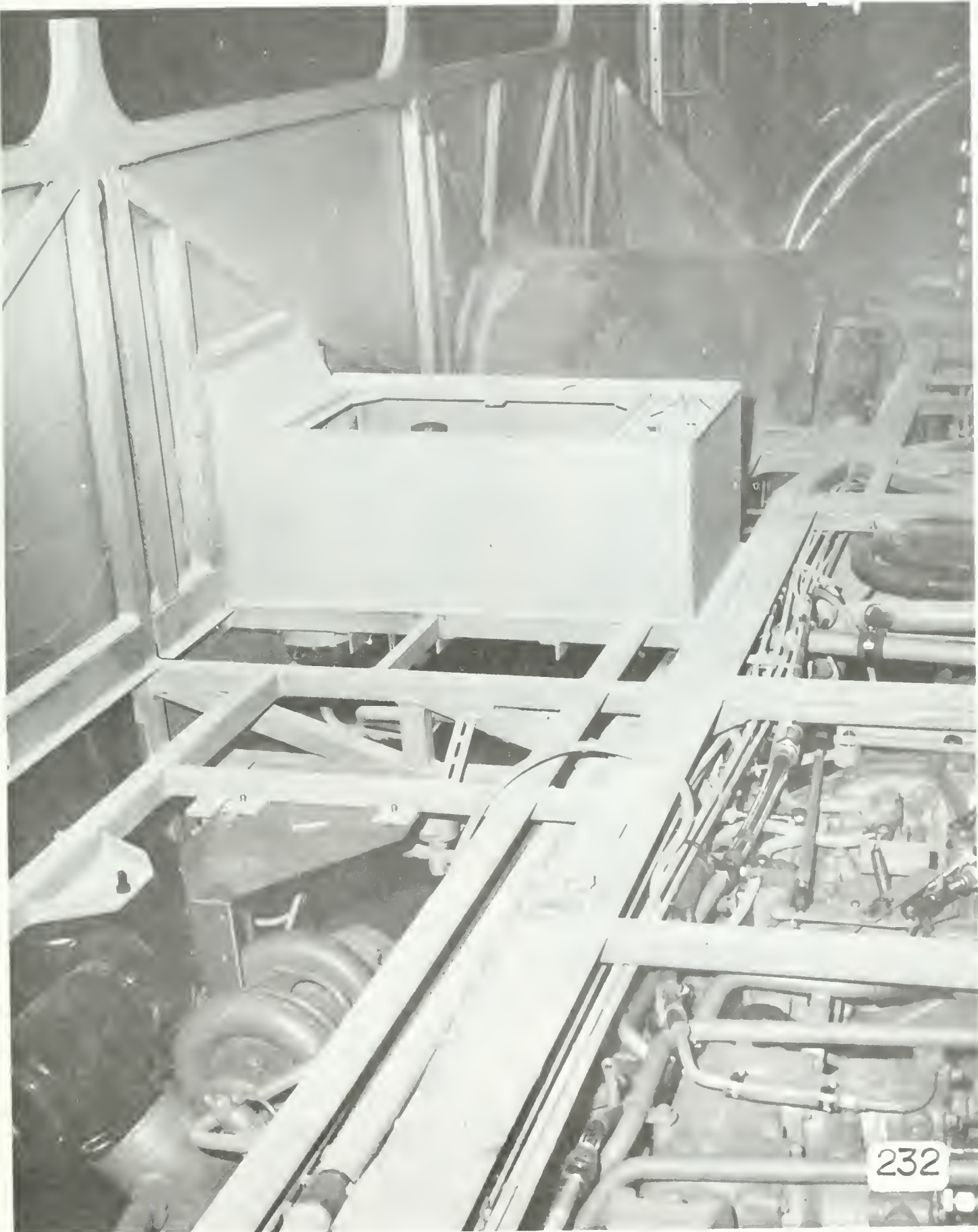




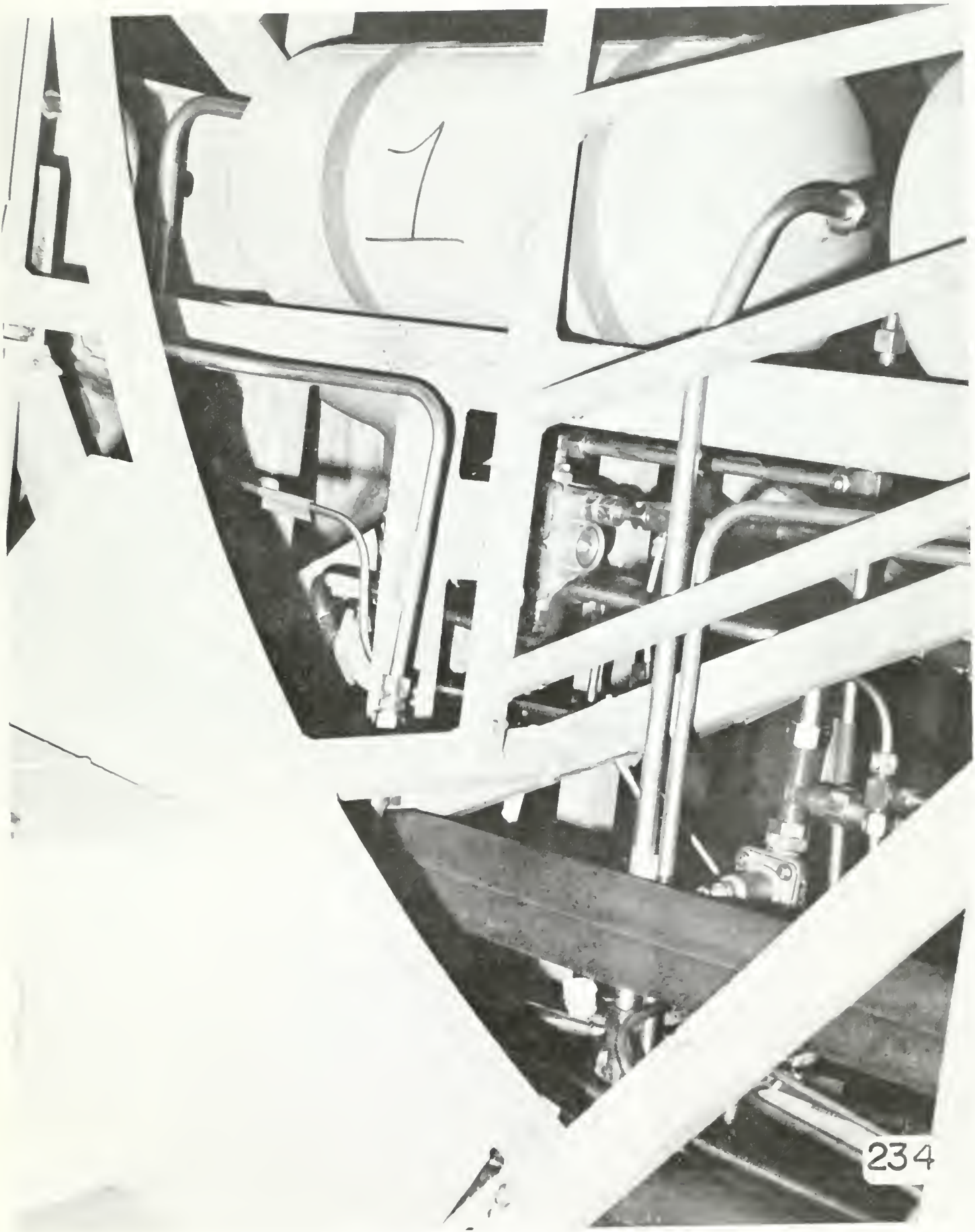




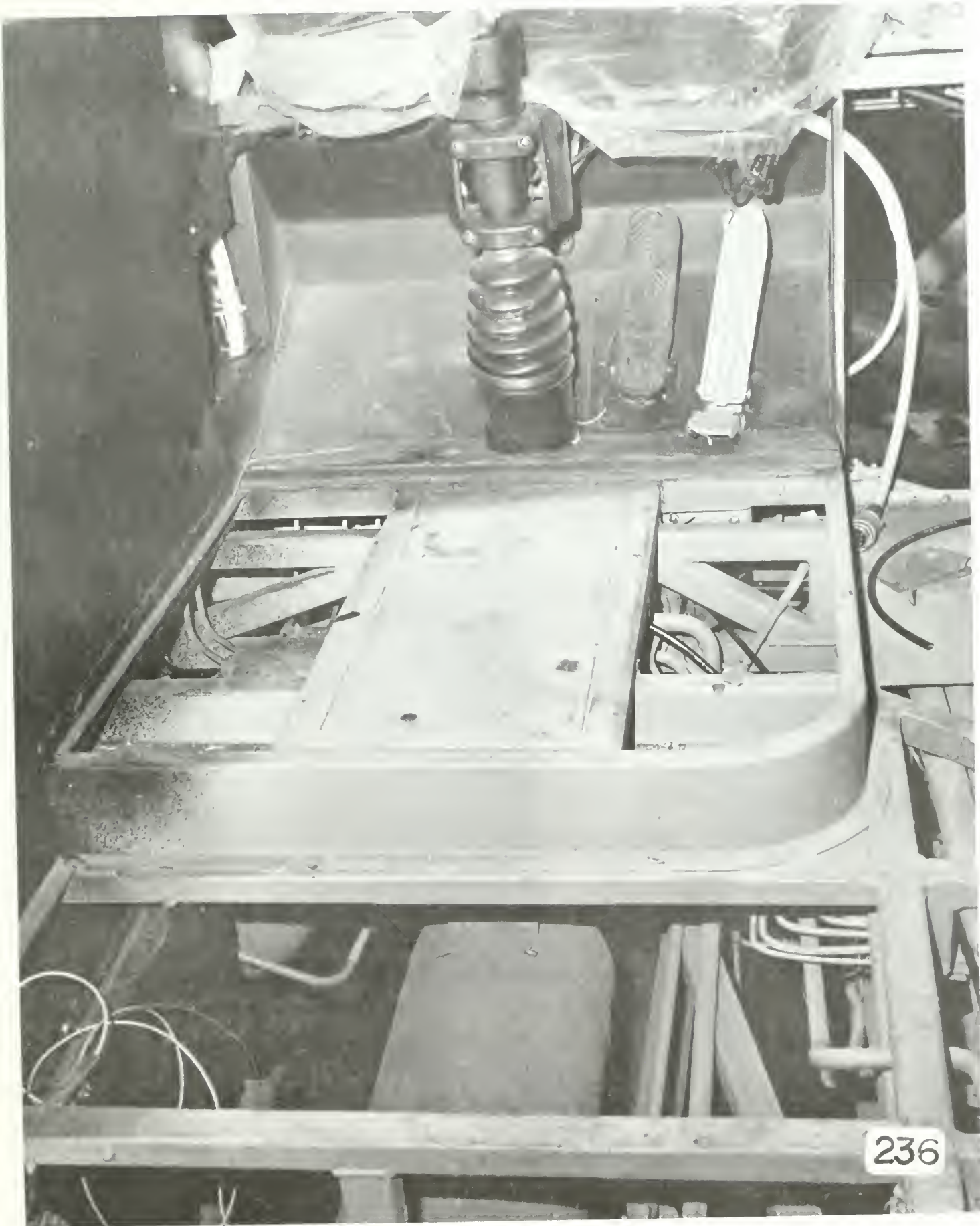




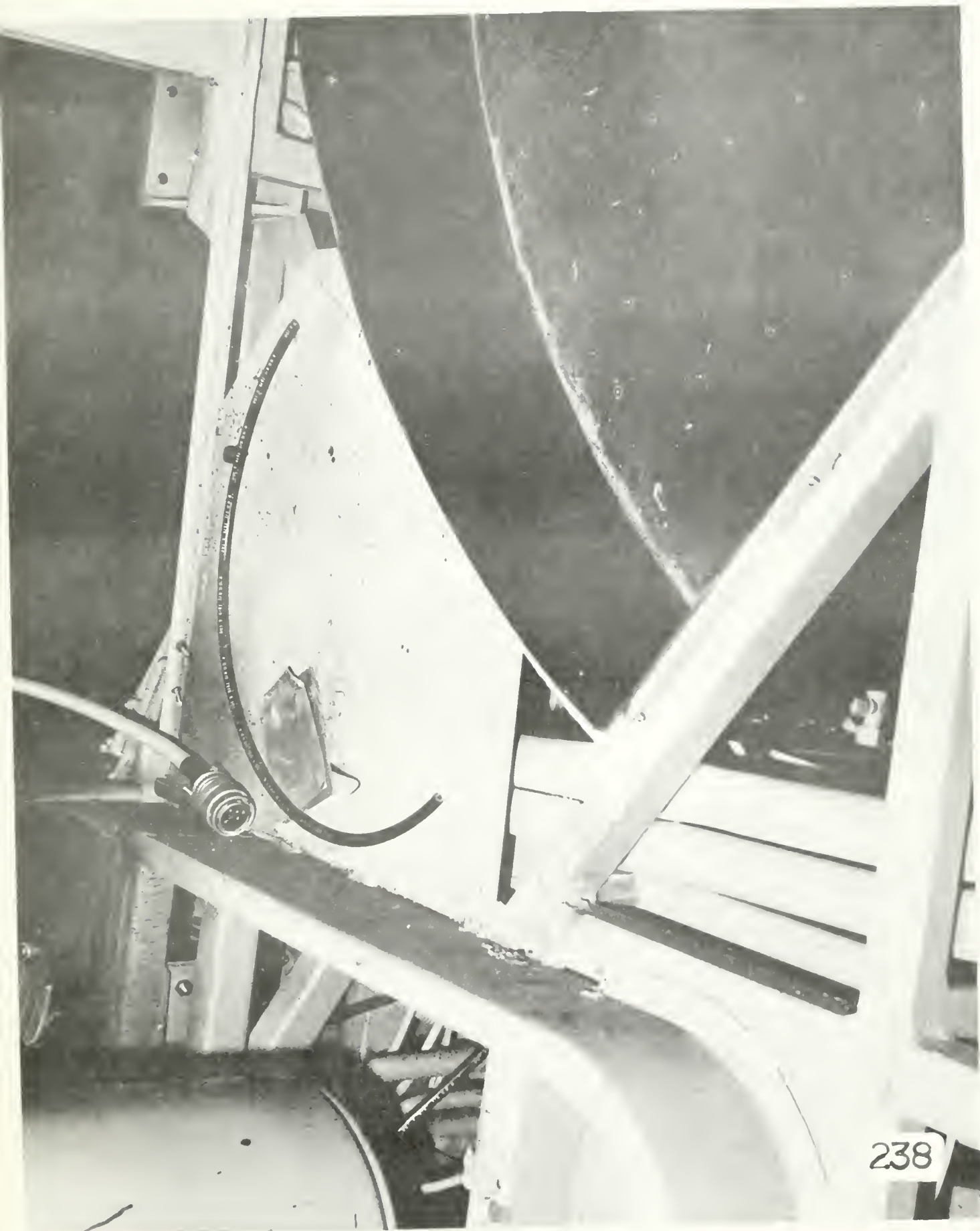


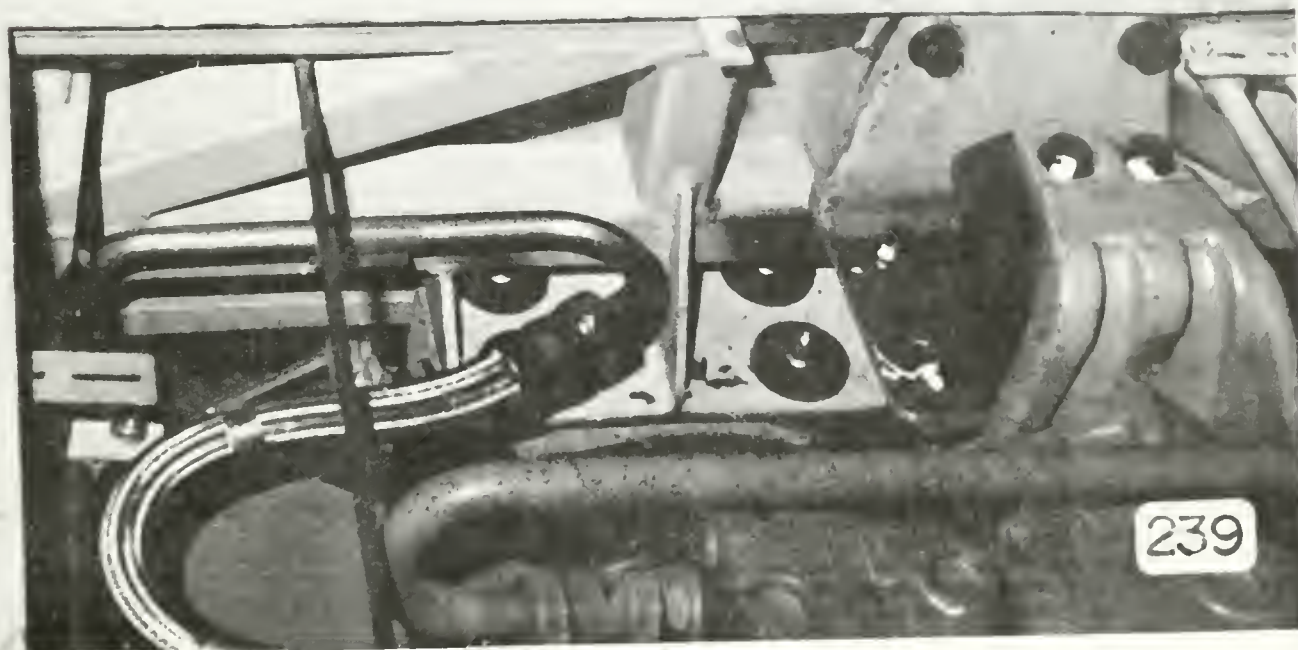
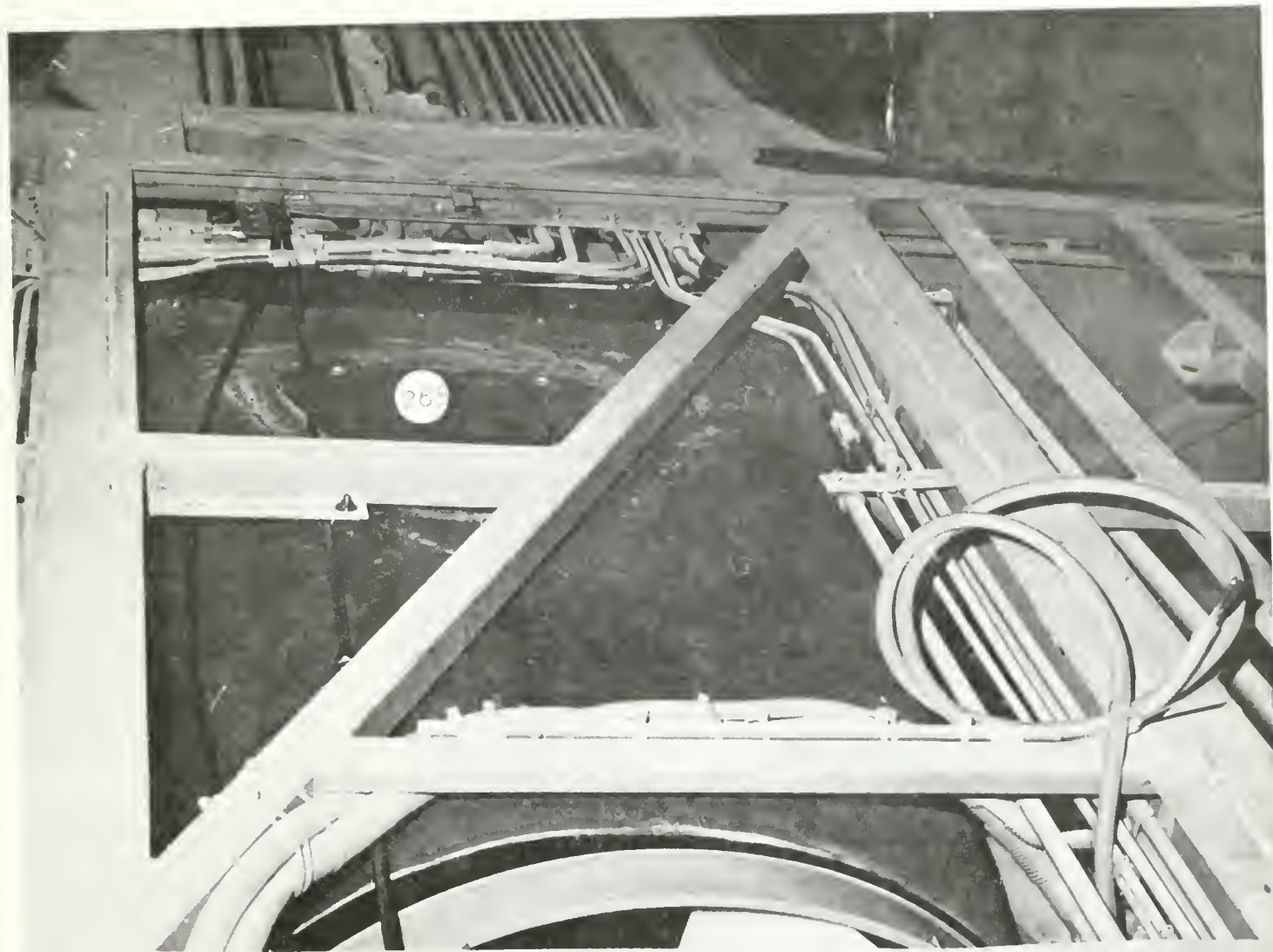


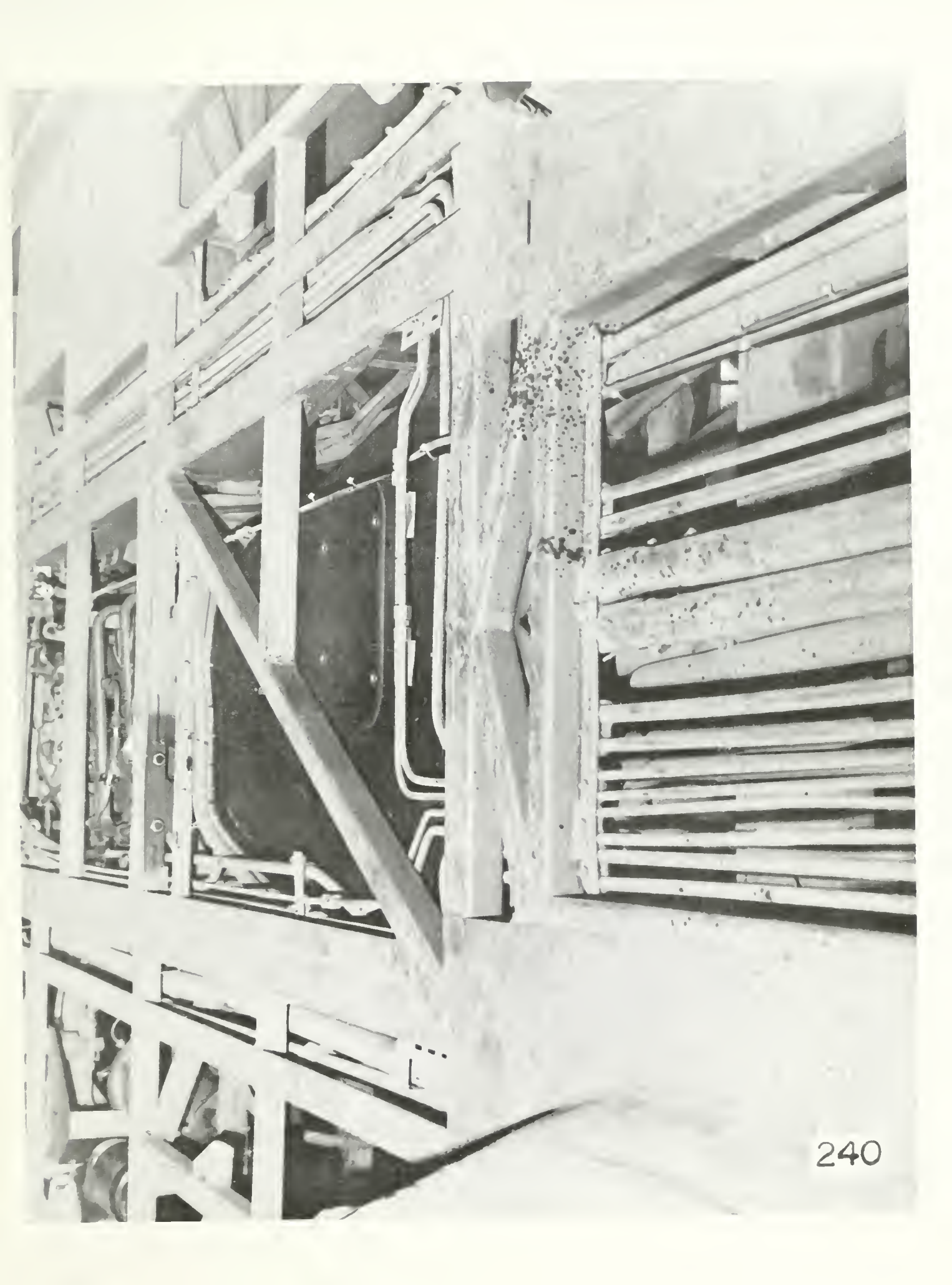


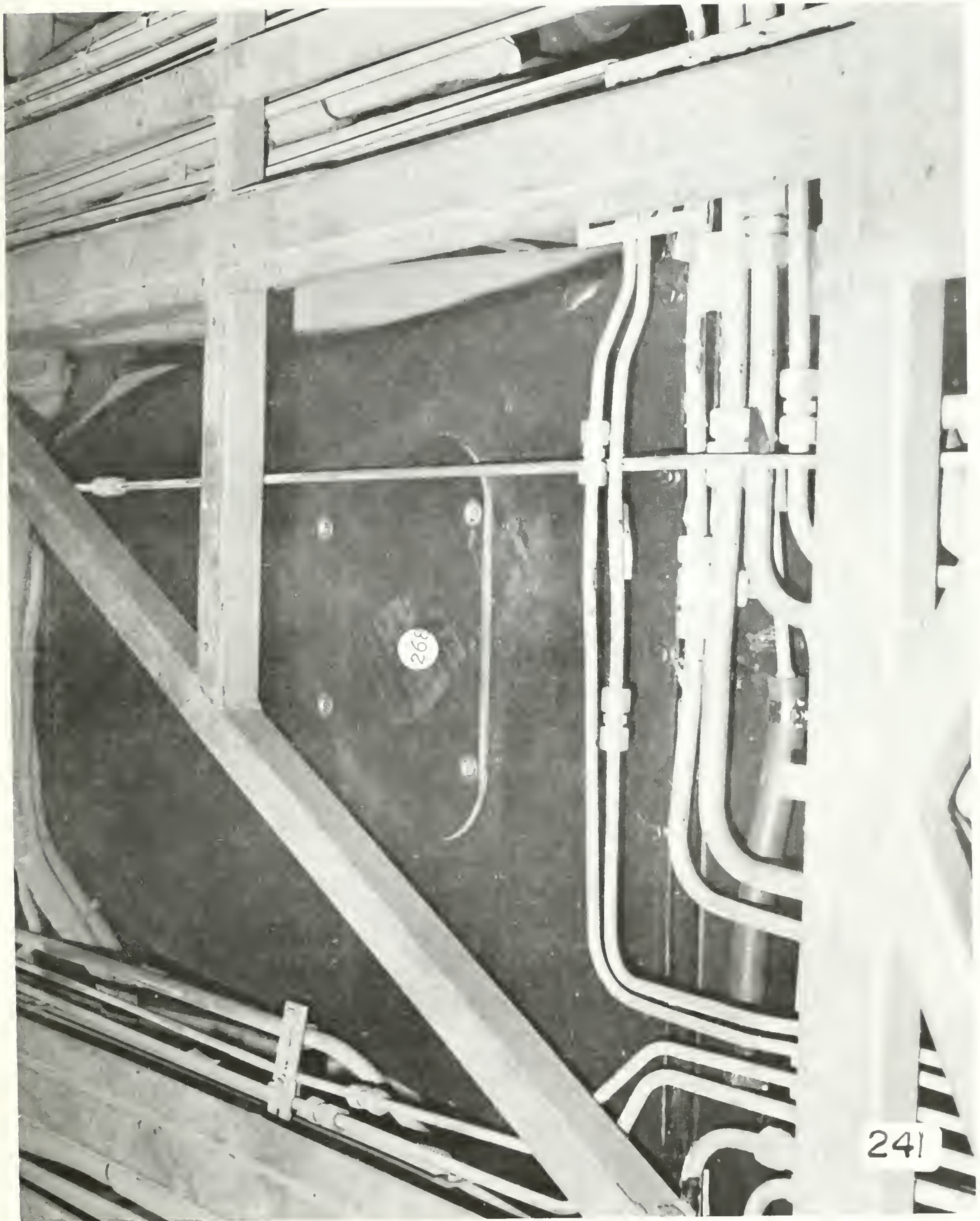


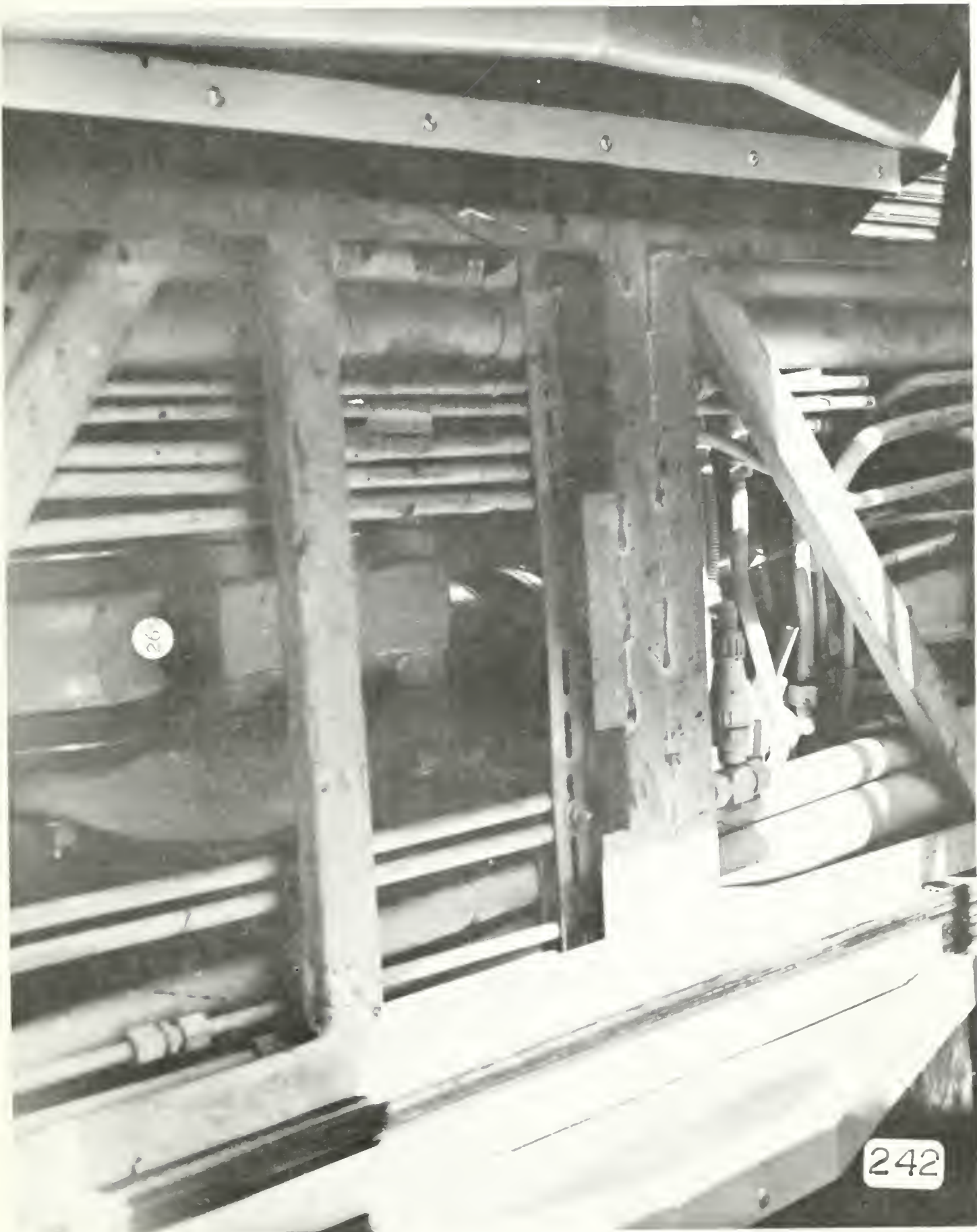


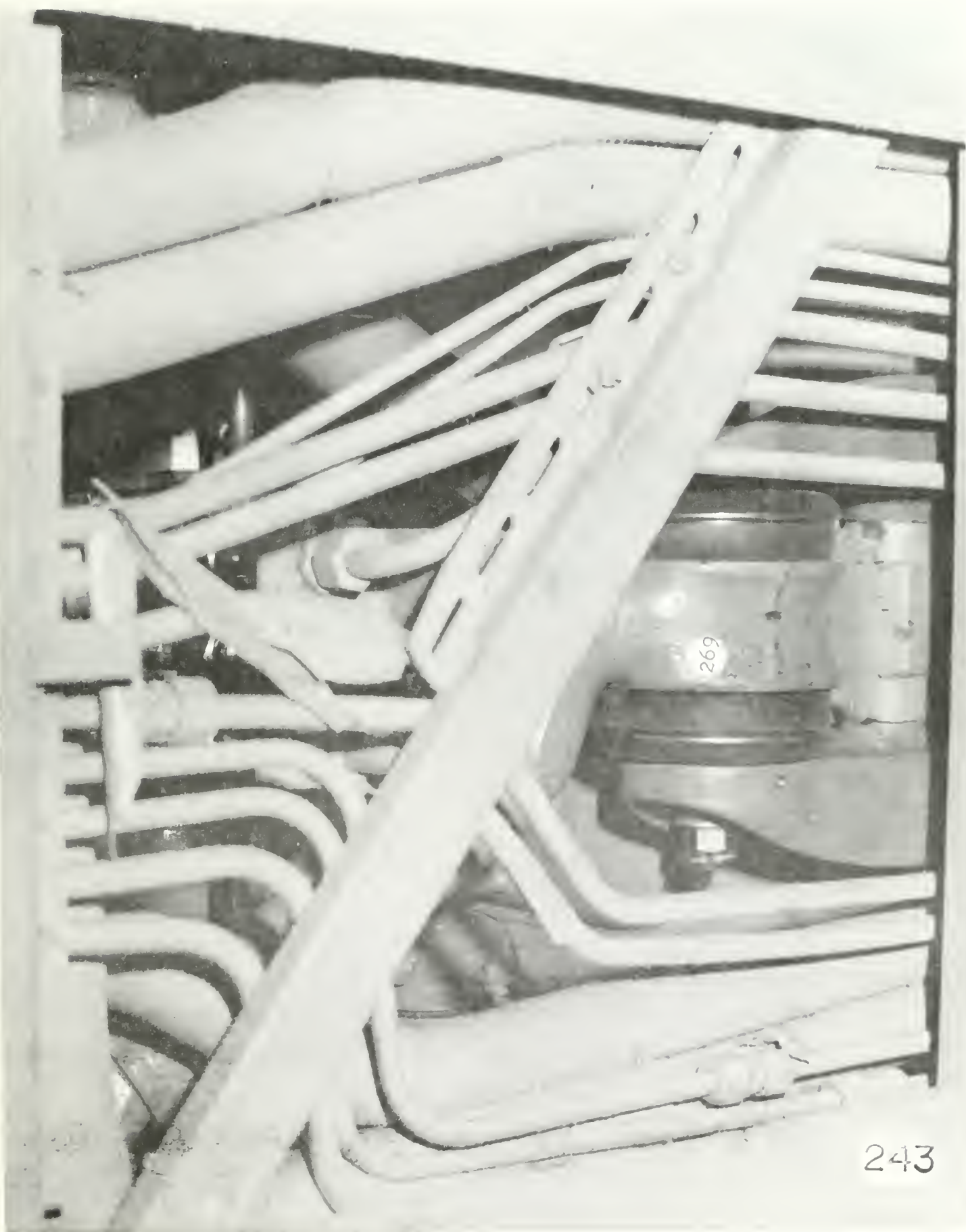


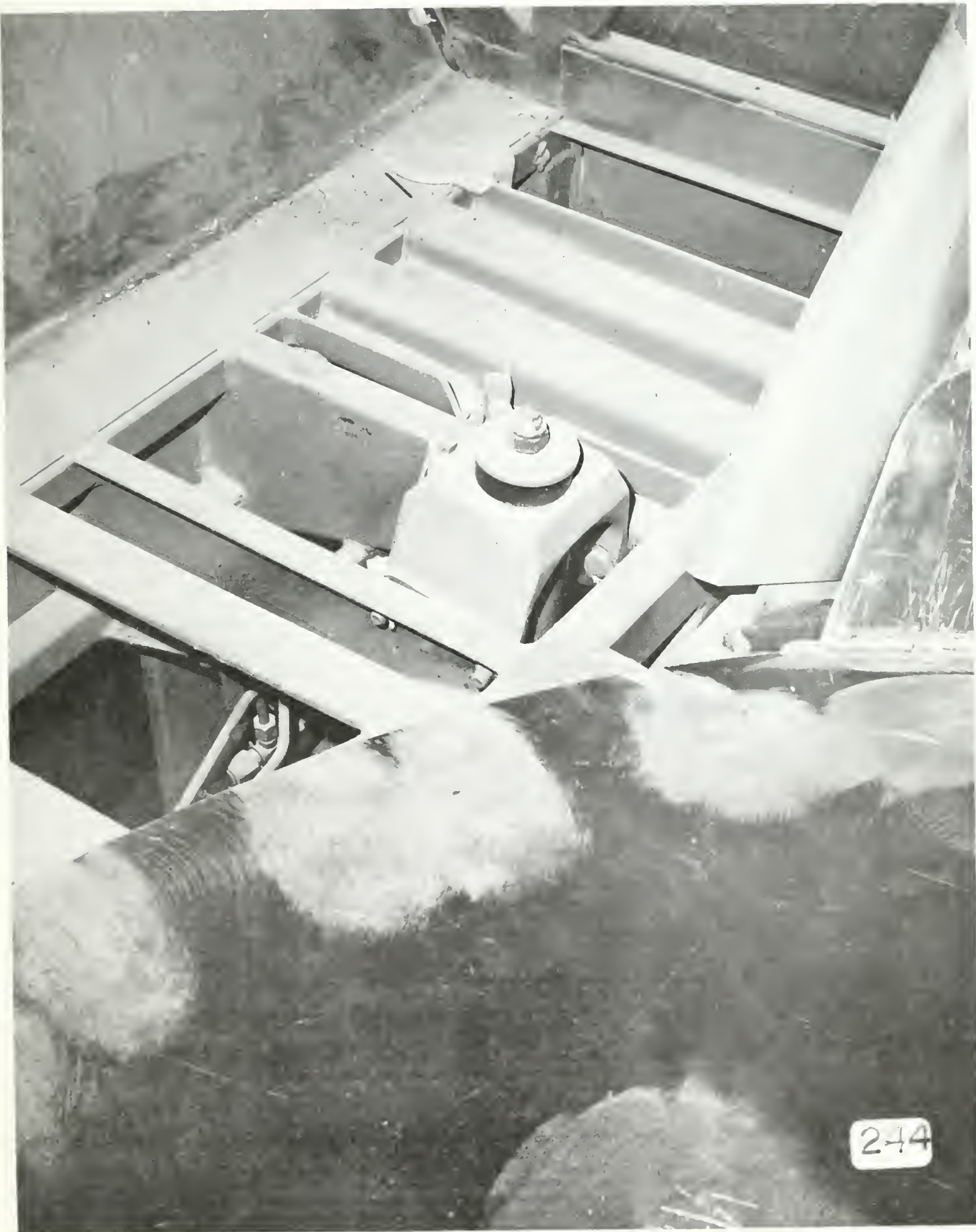




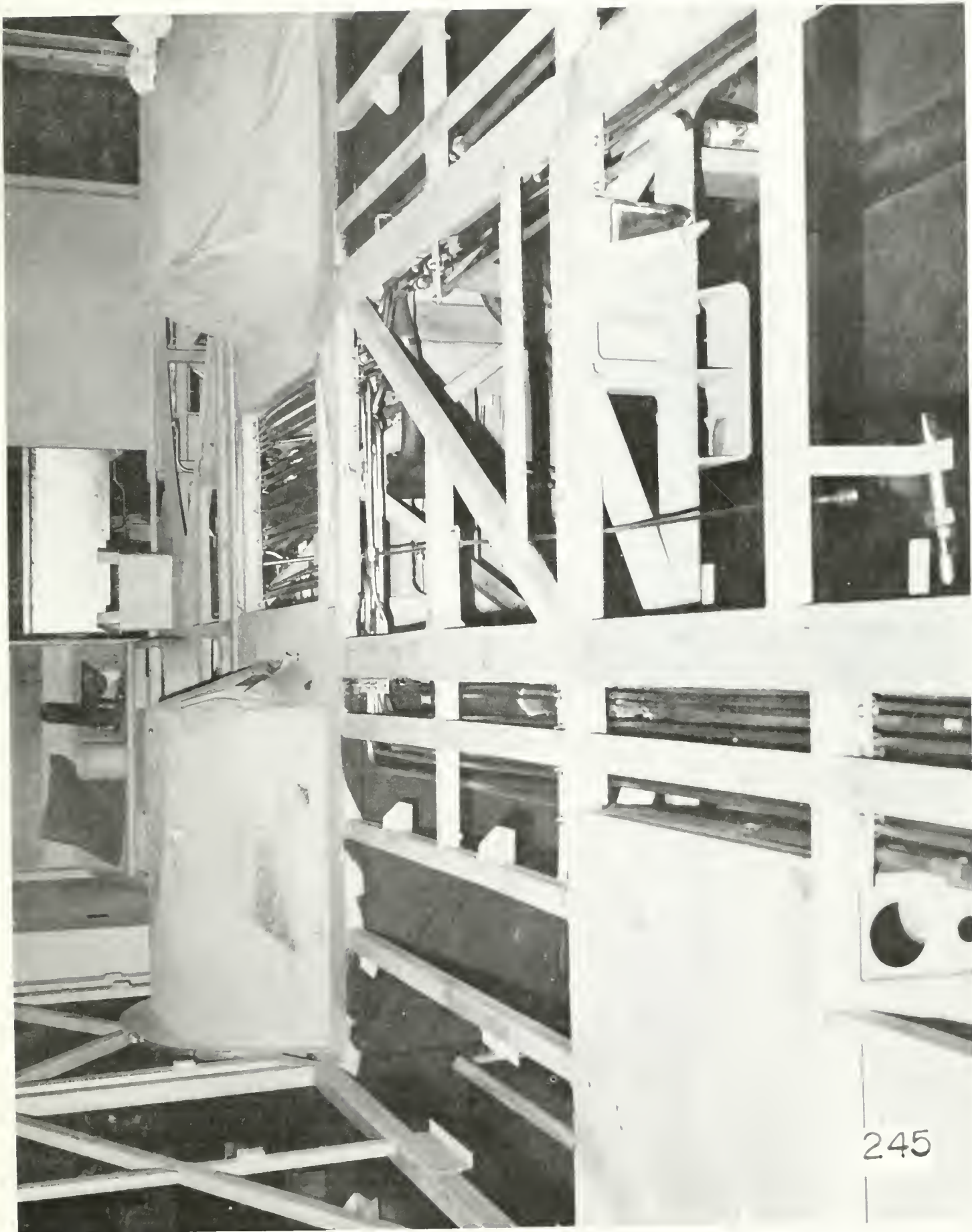






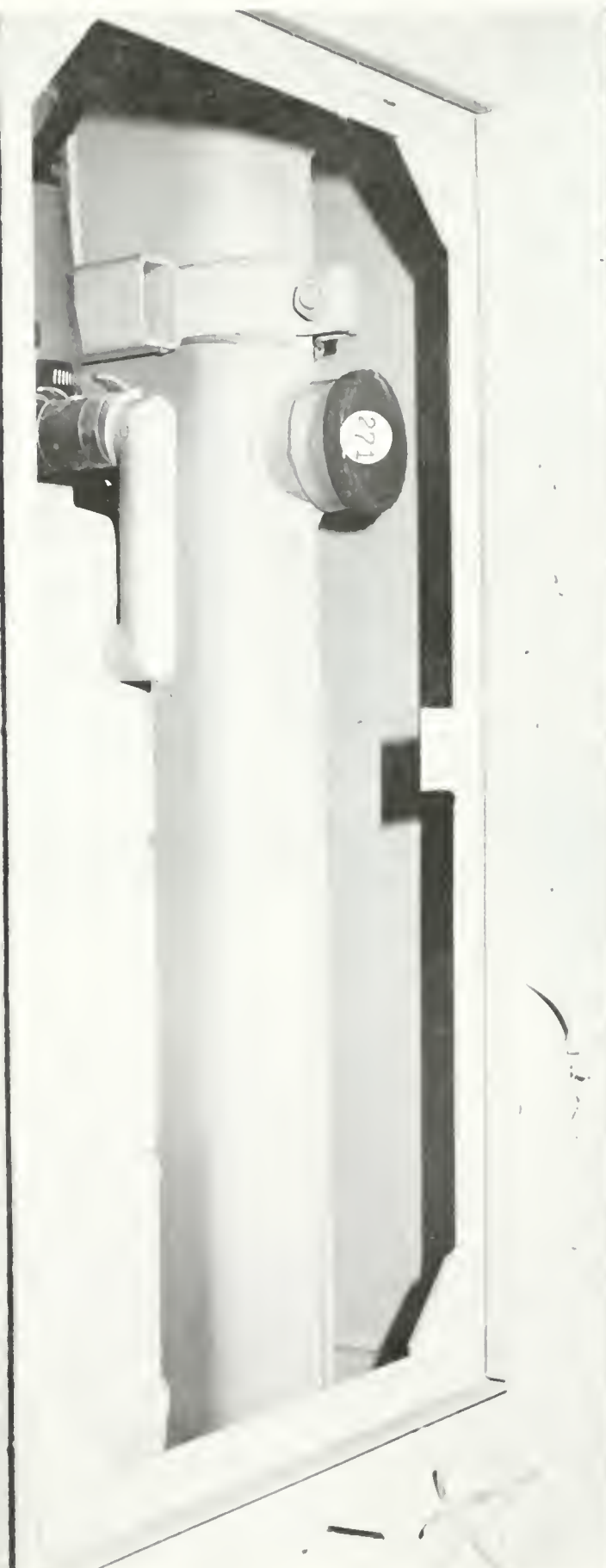


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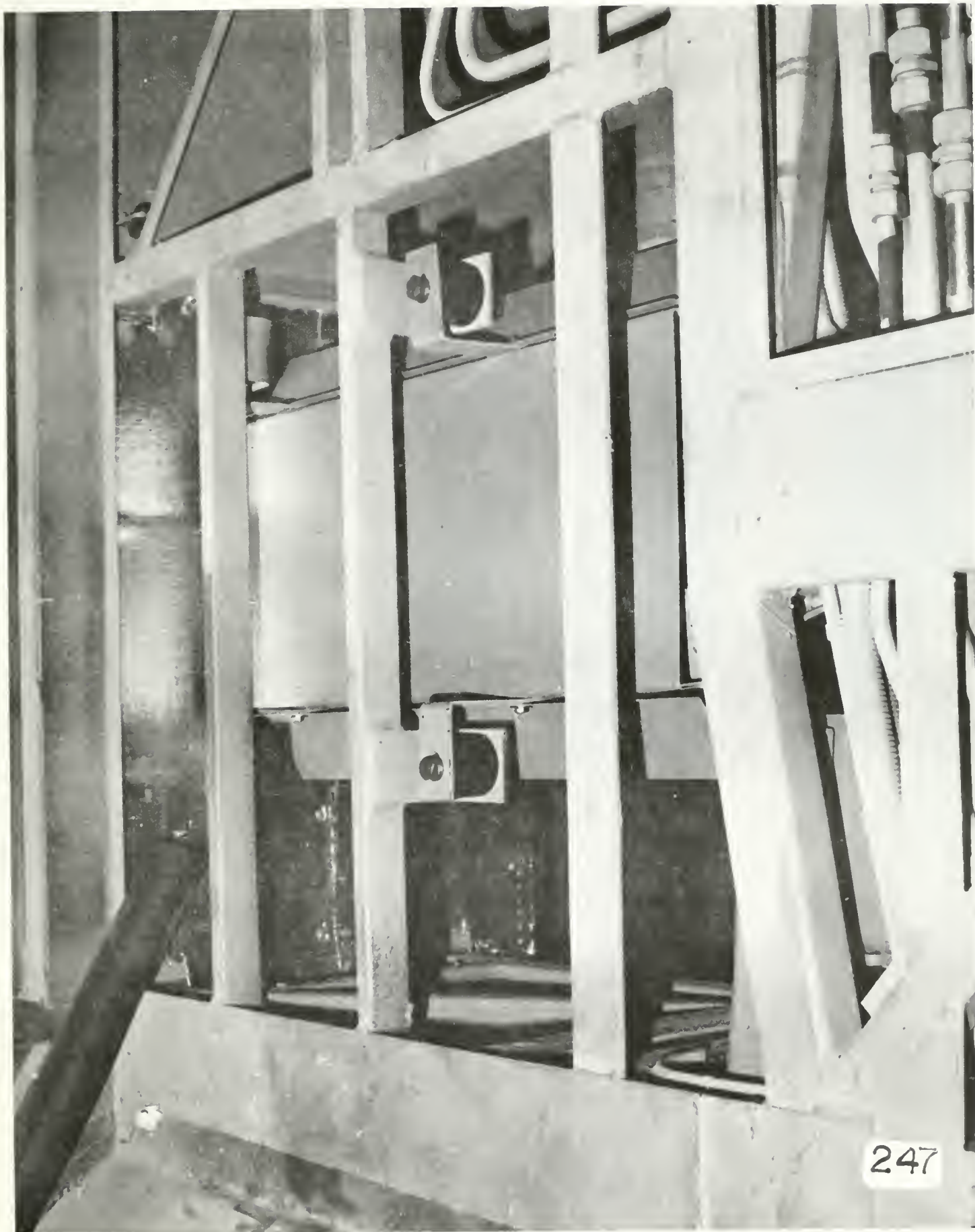




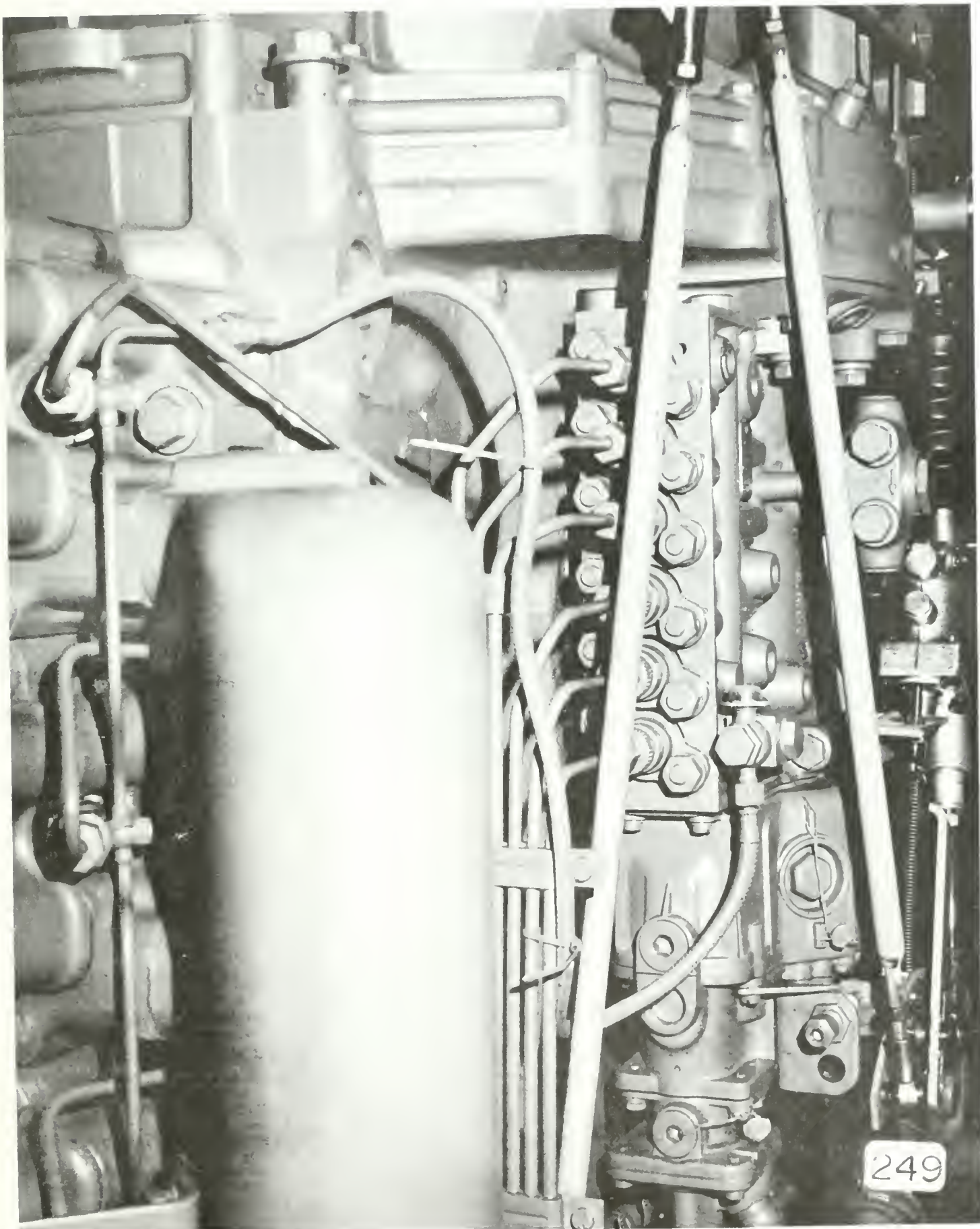
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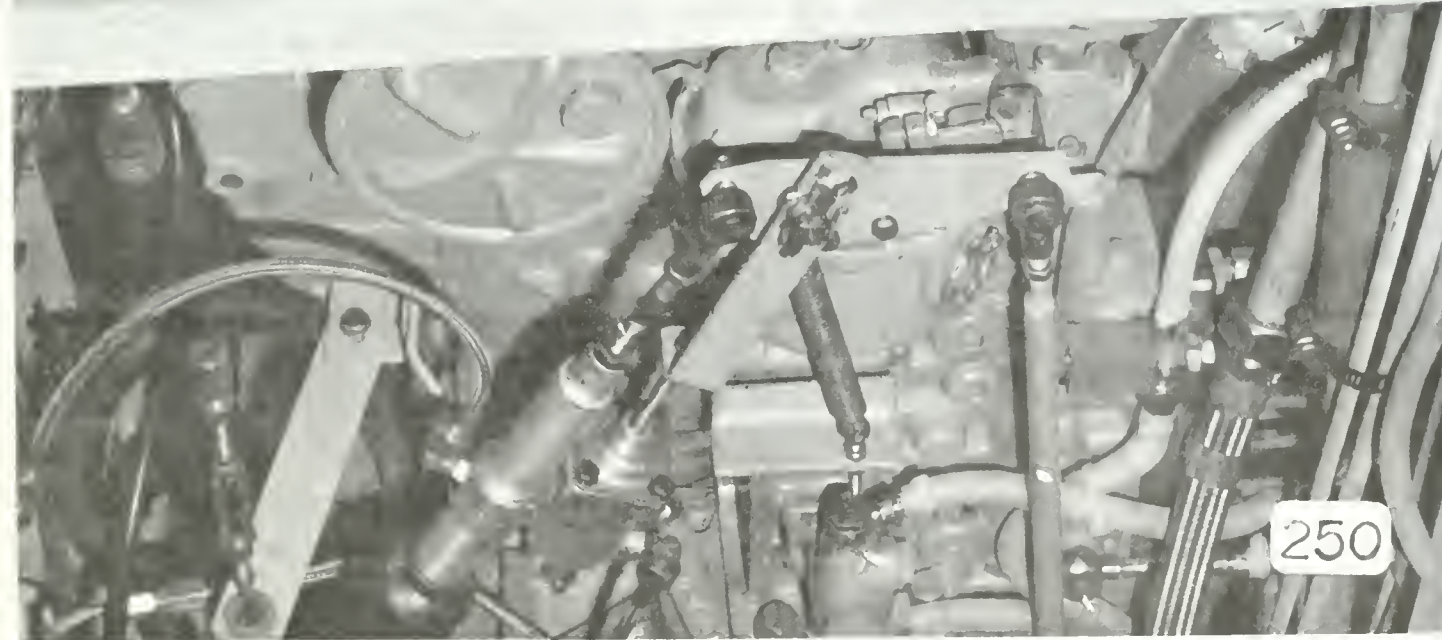
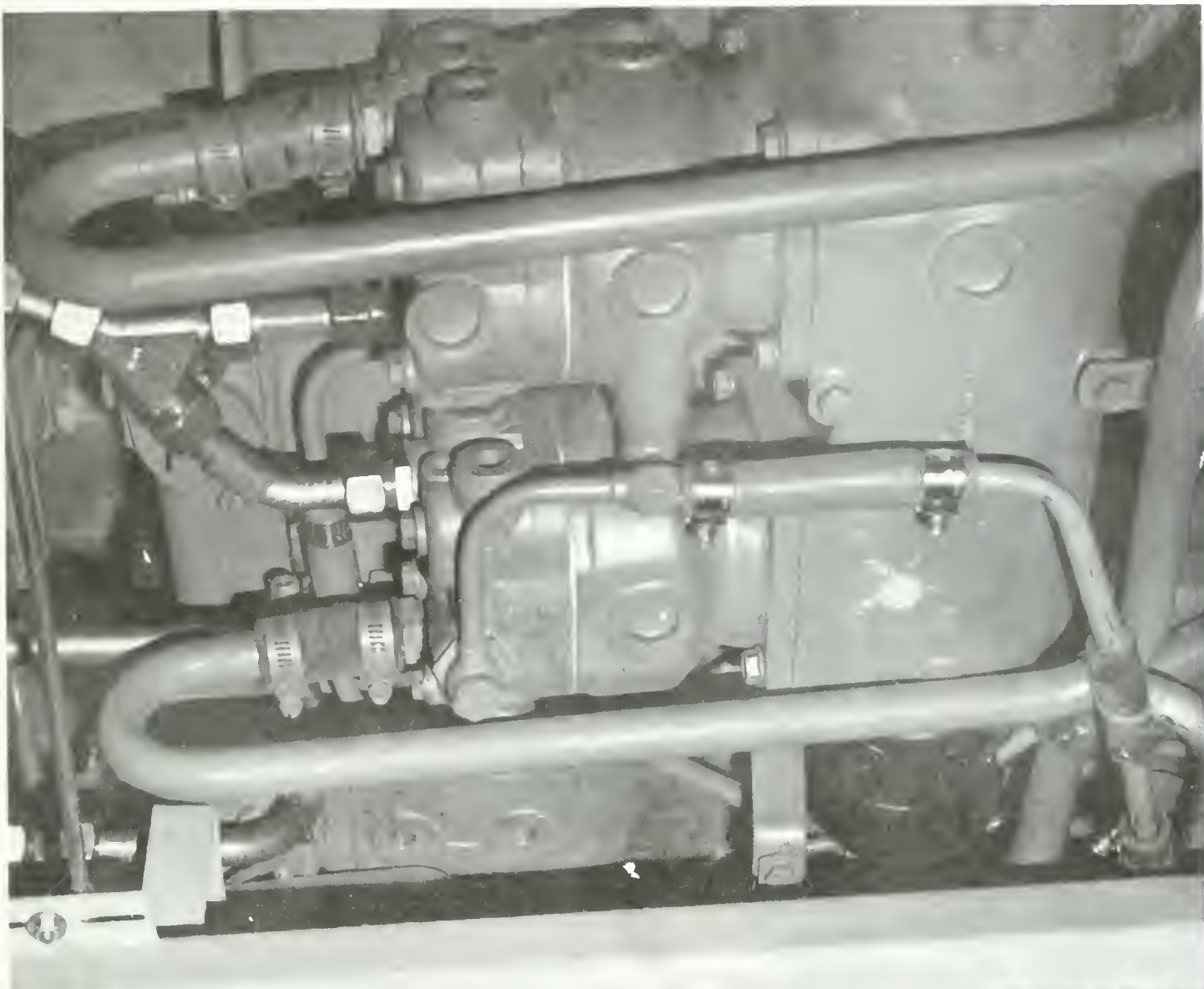


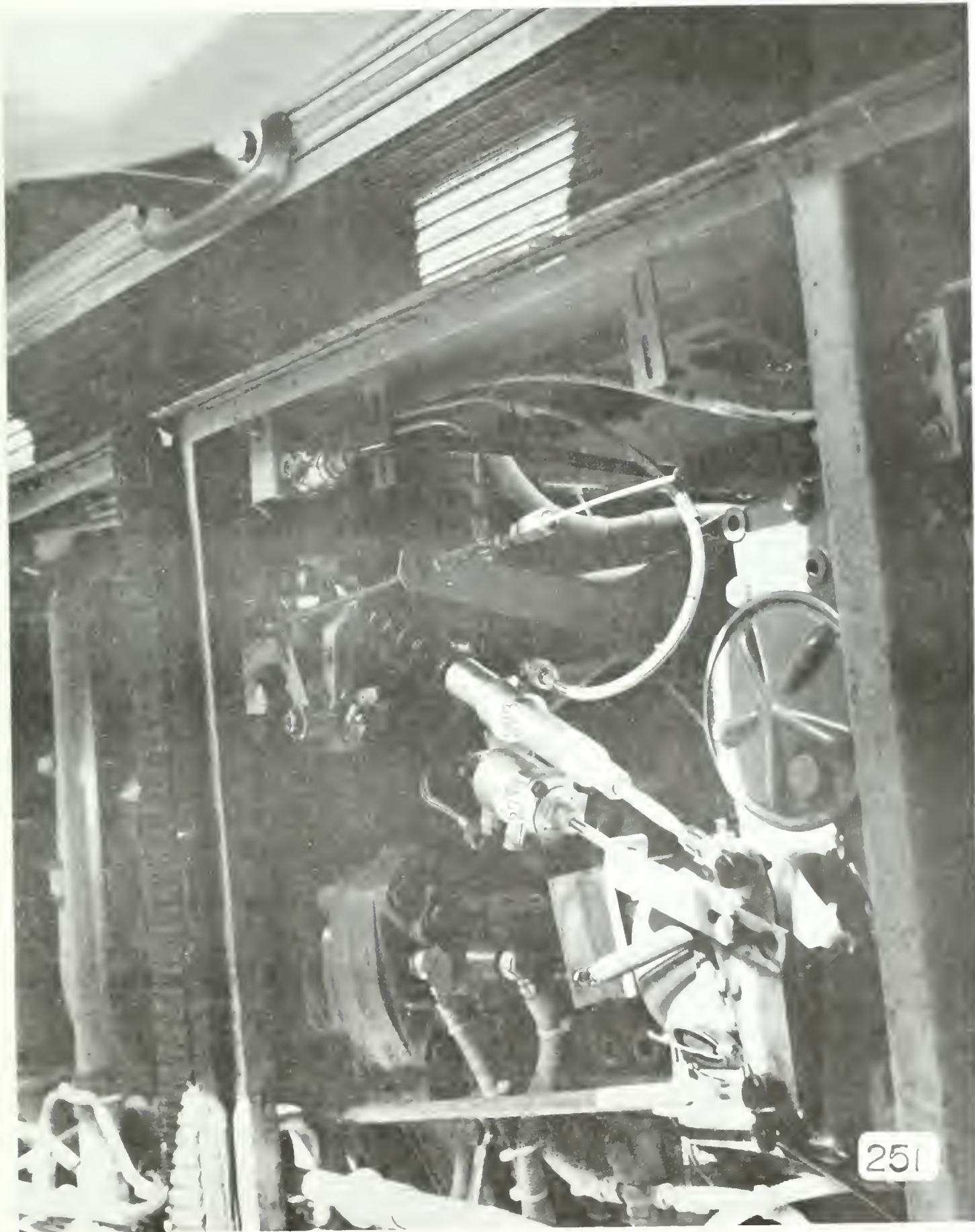
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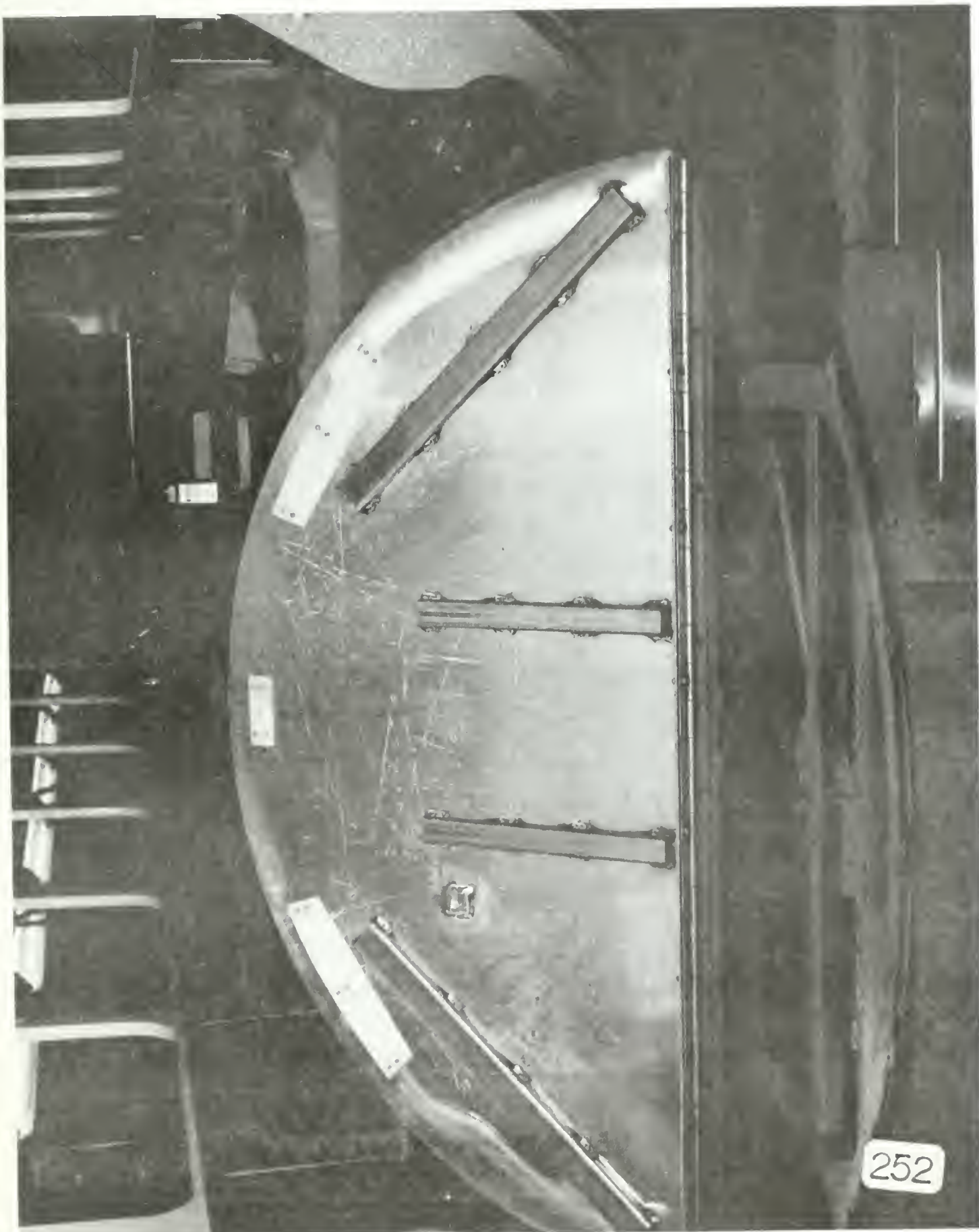




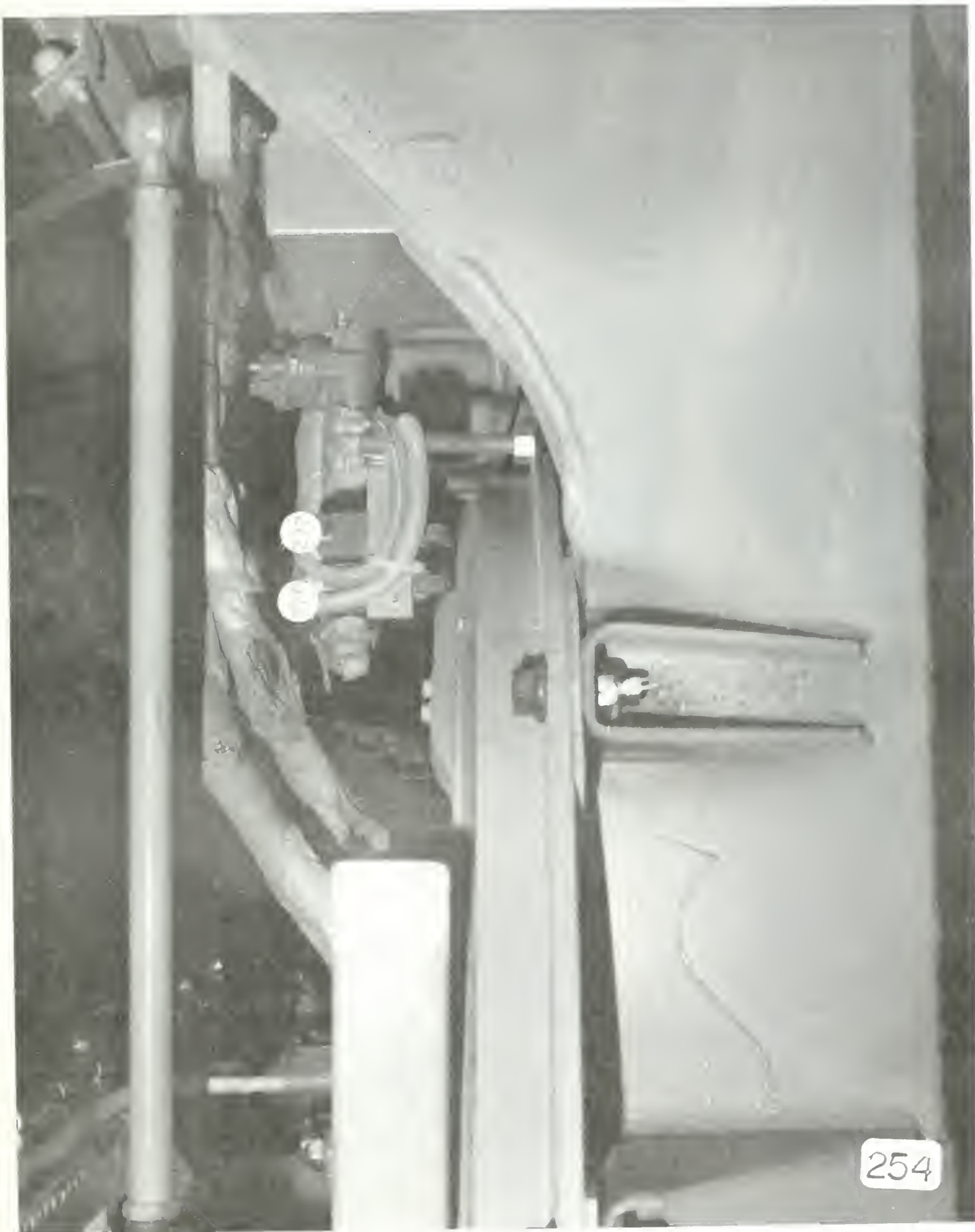






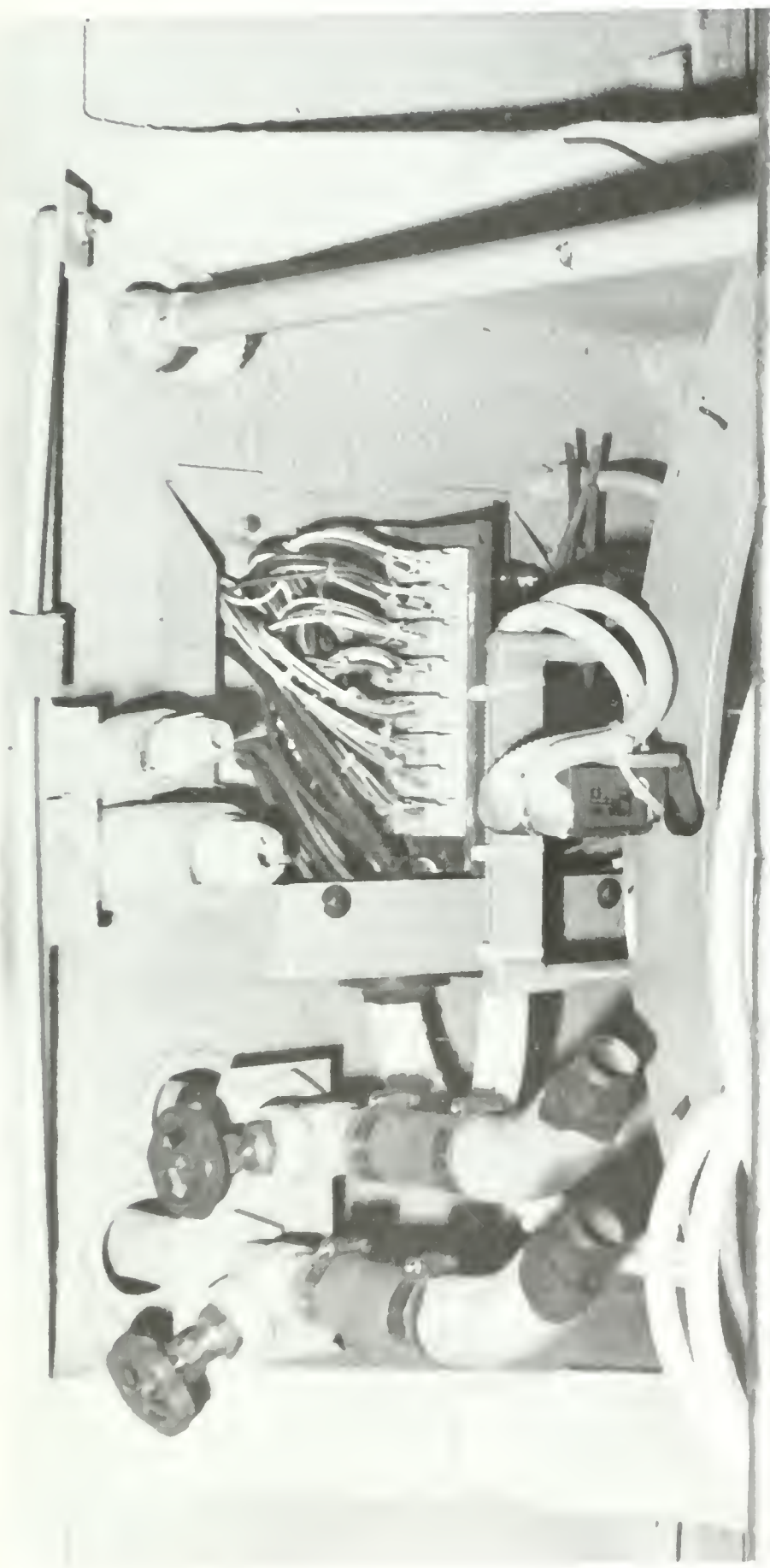


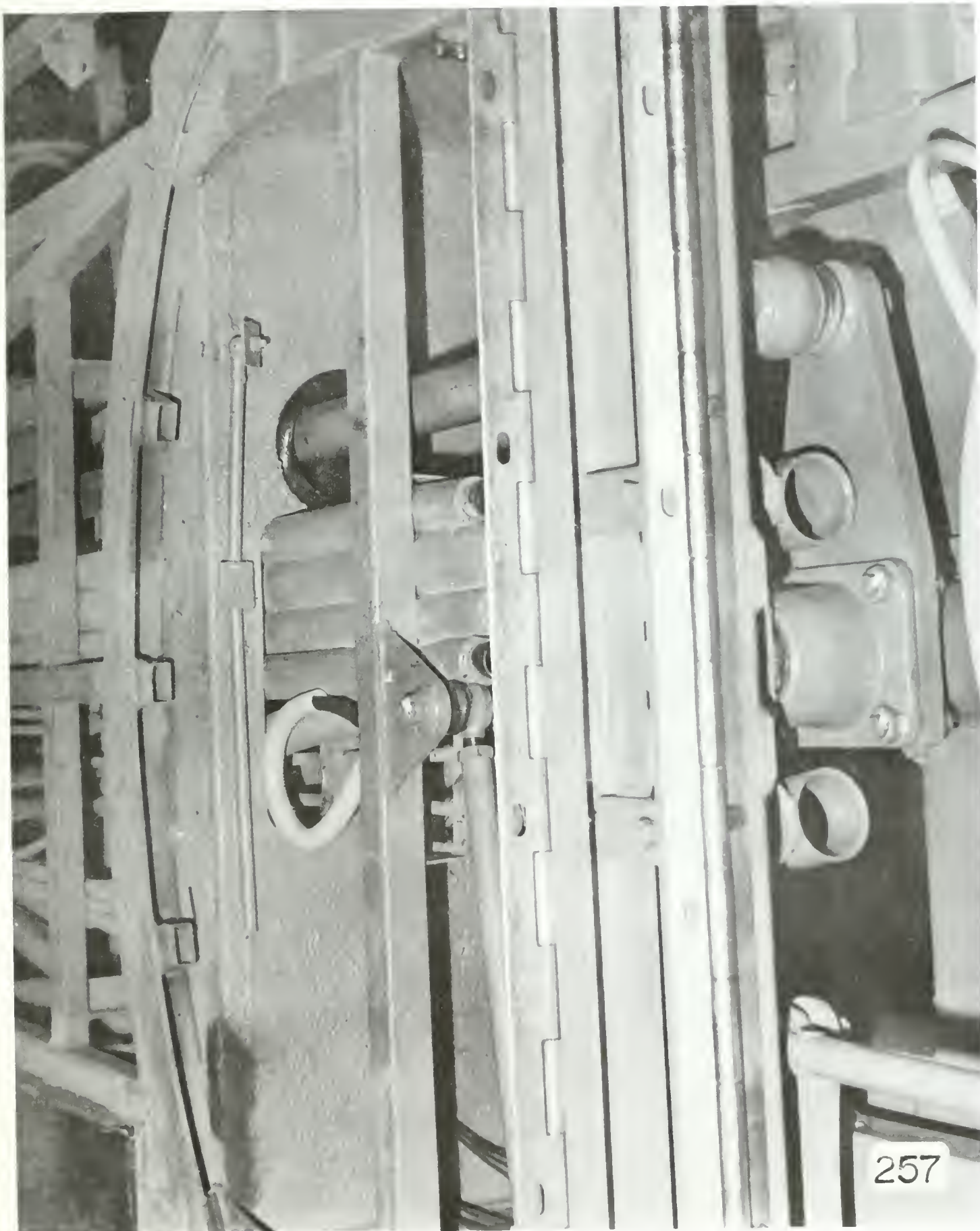


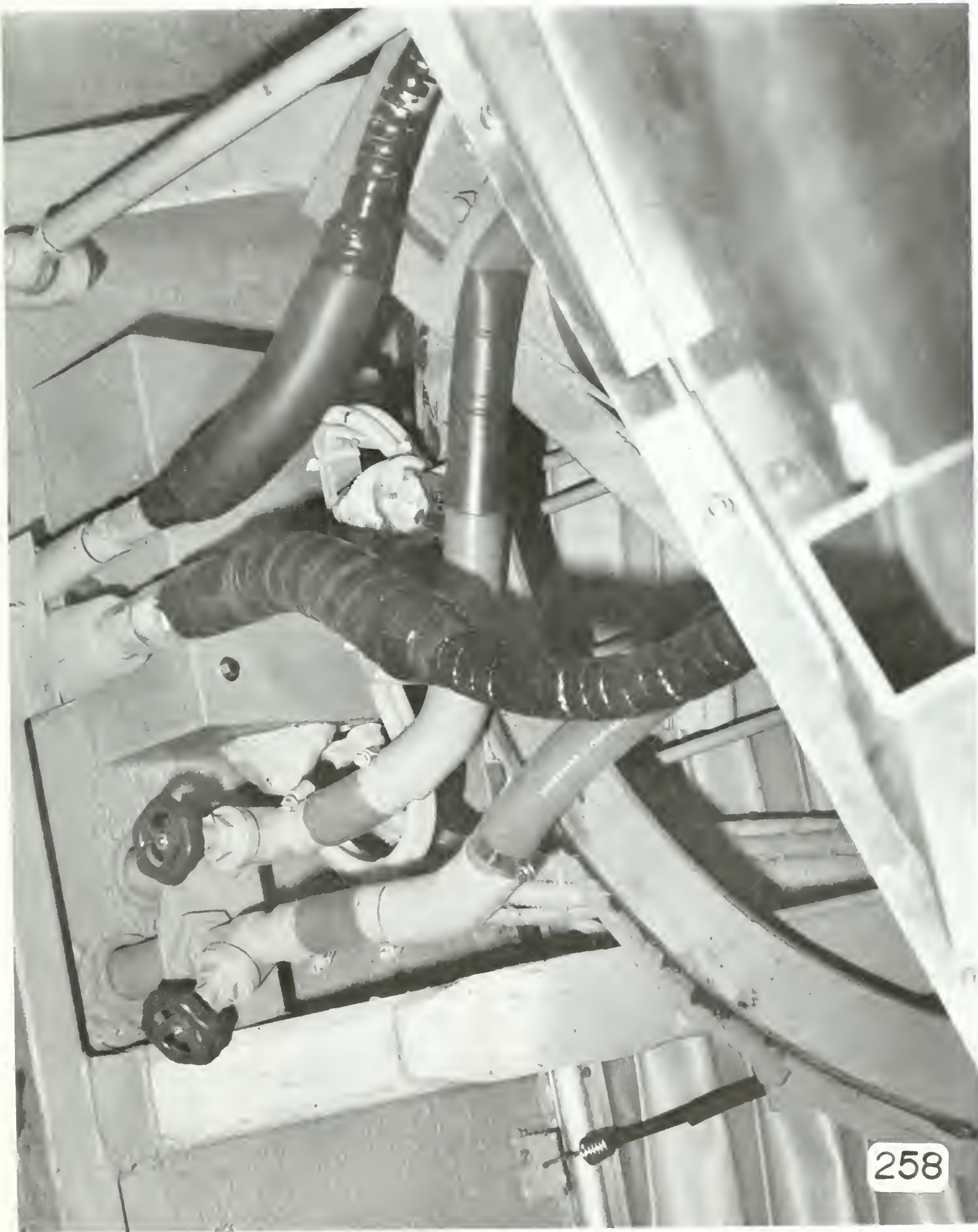


254

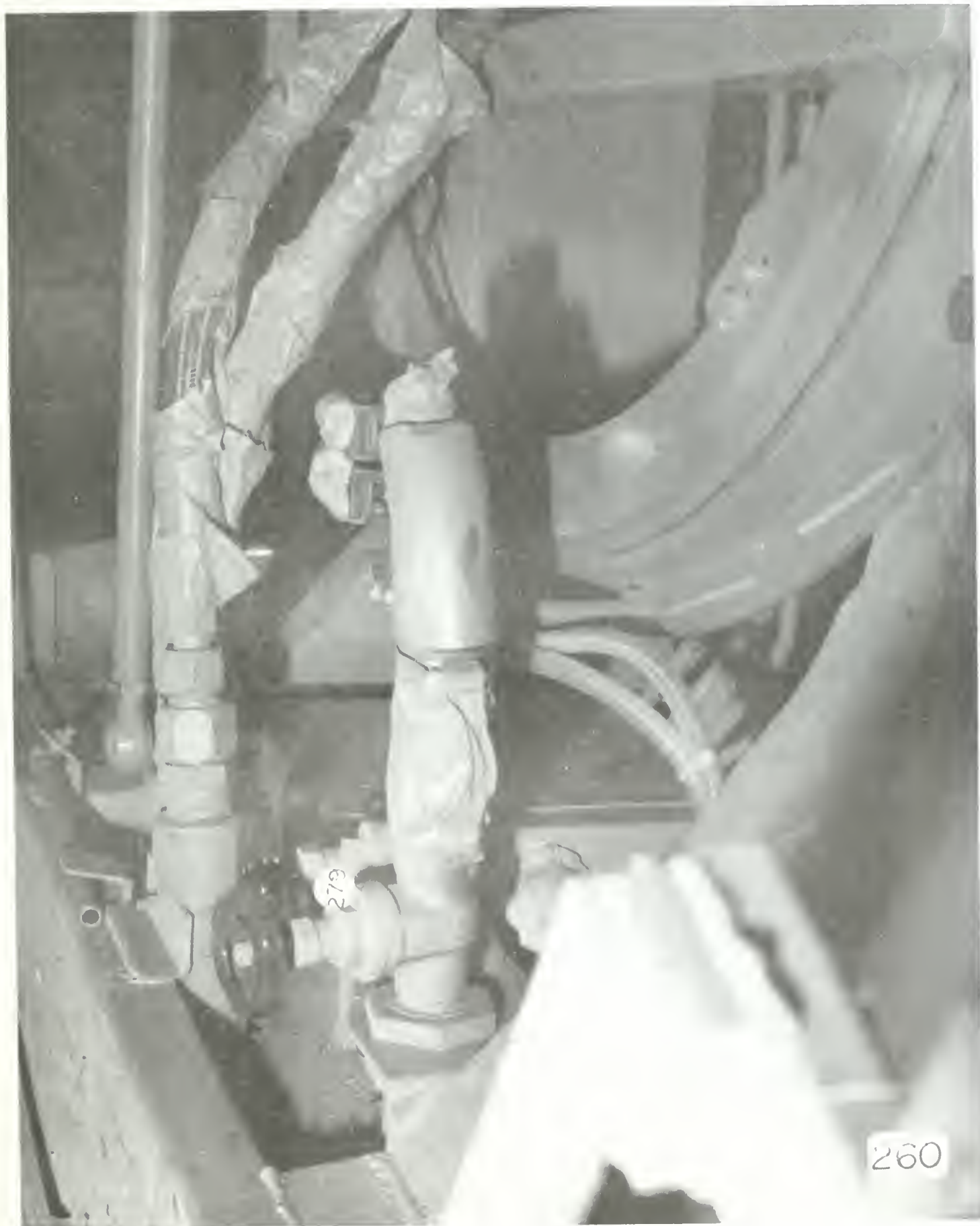


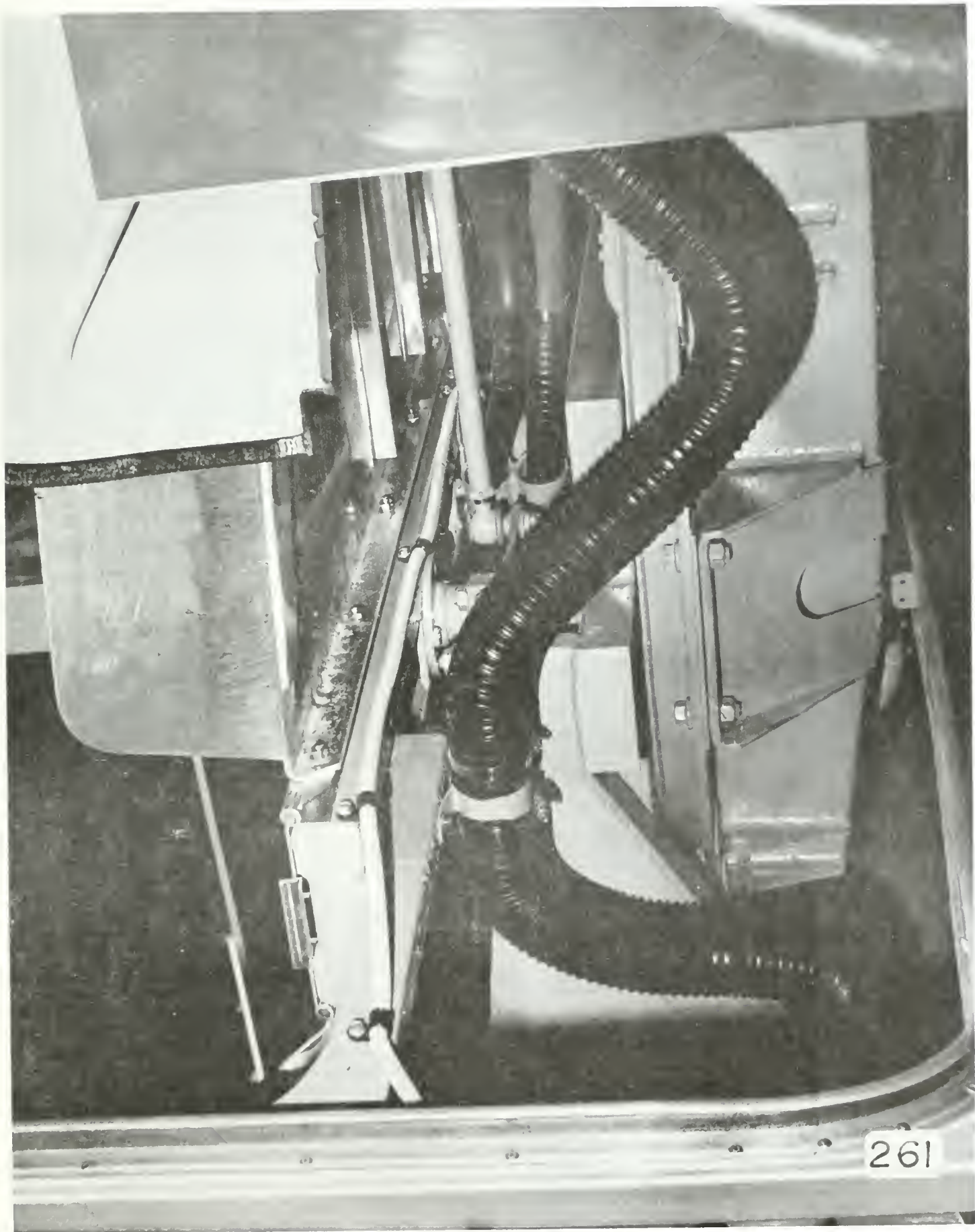




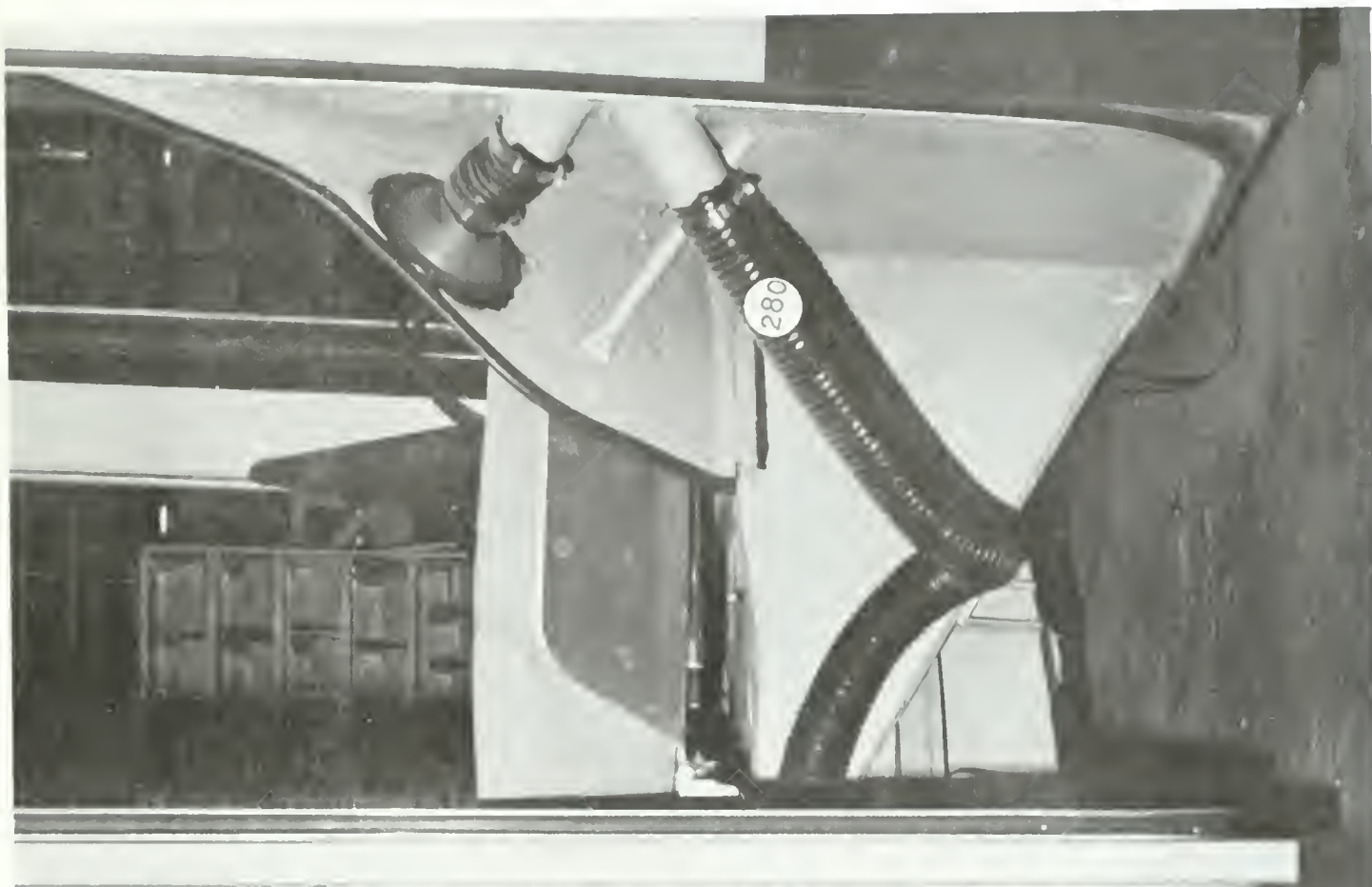


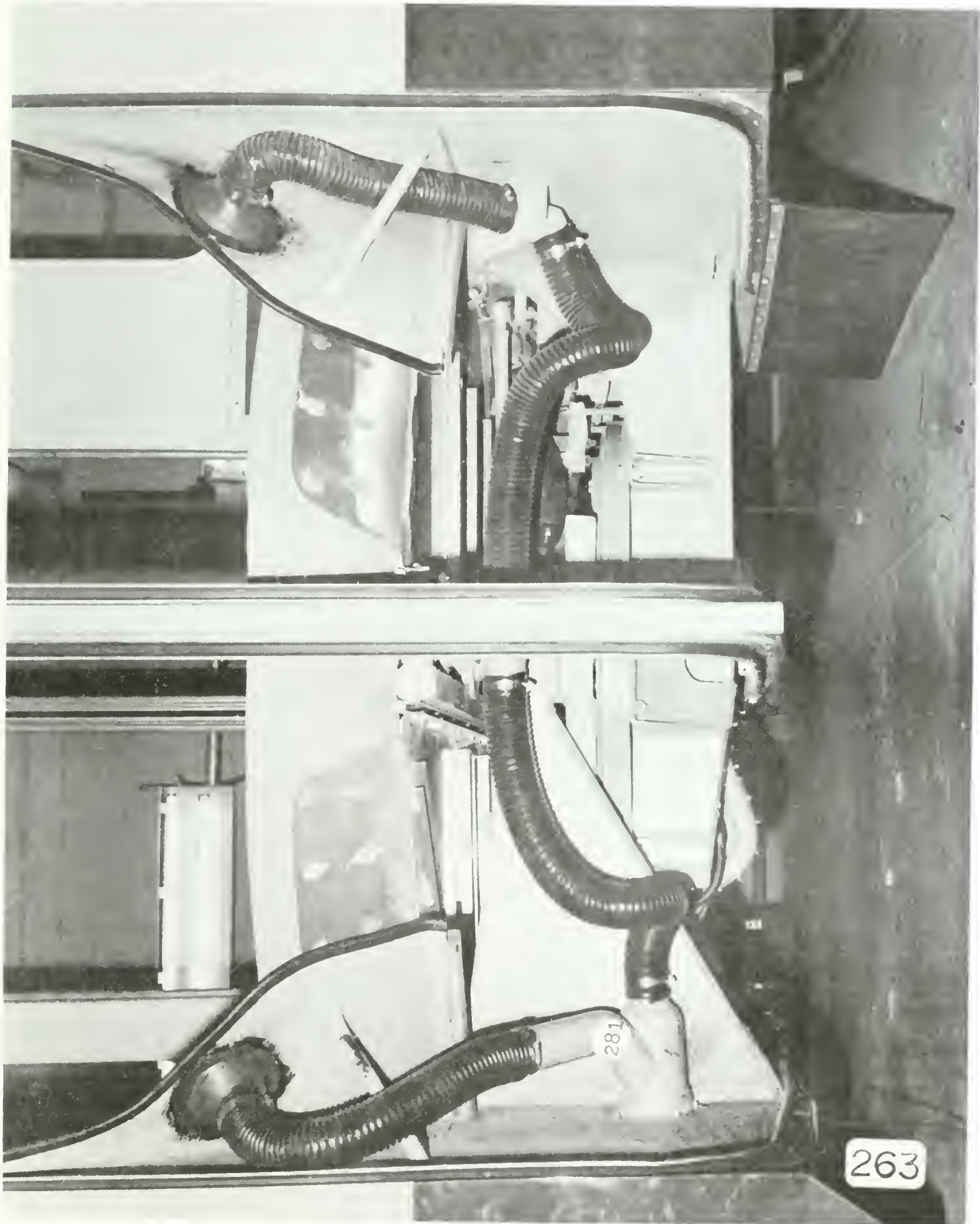




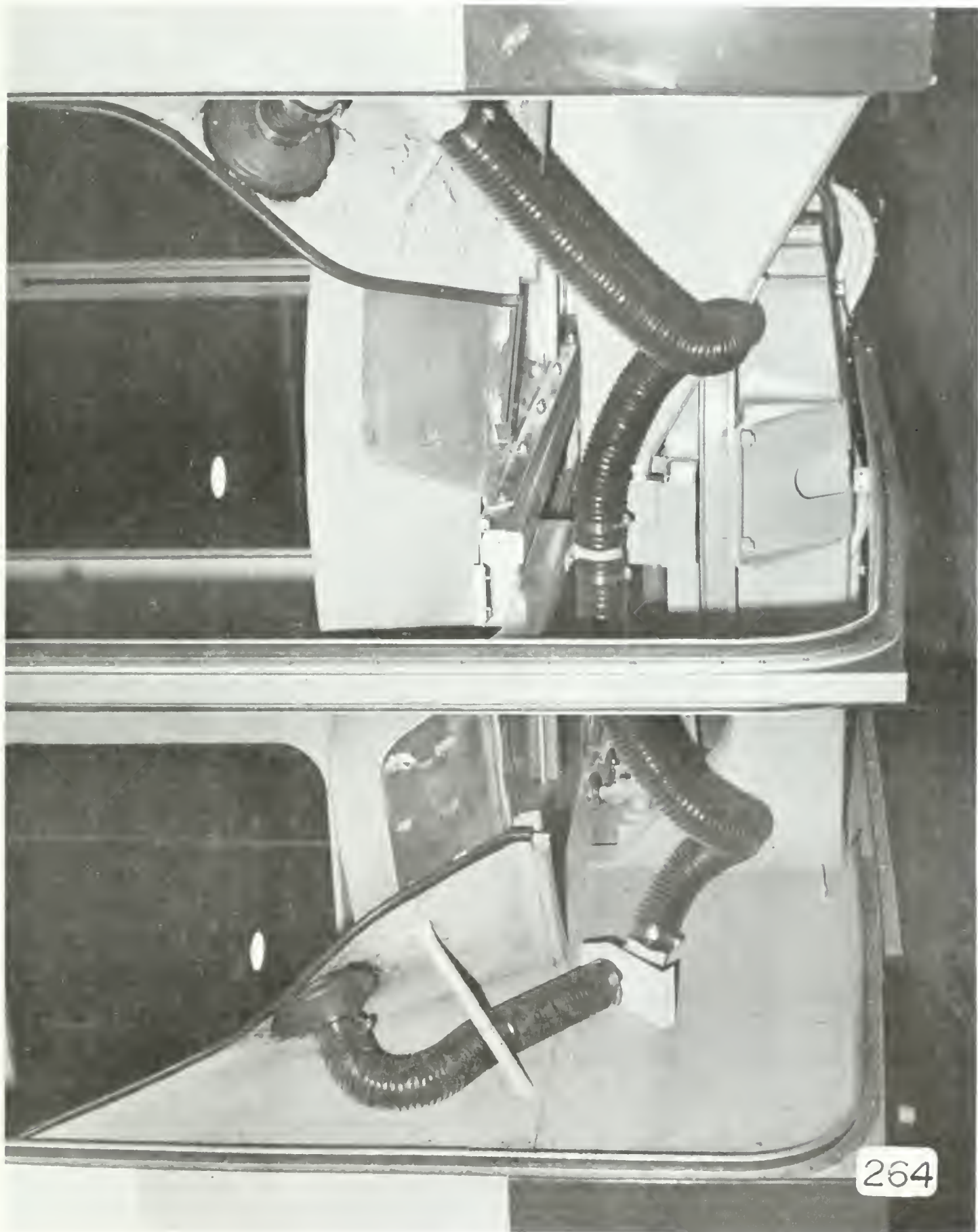


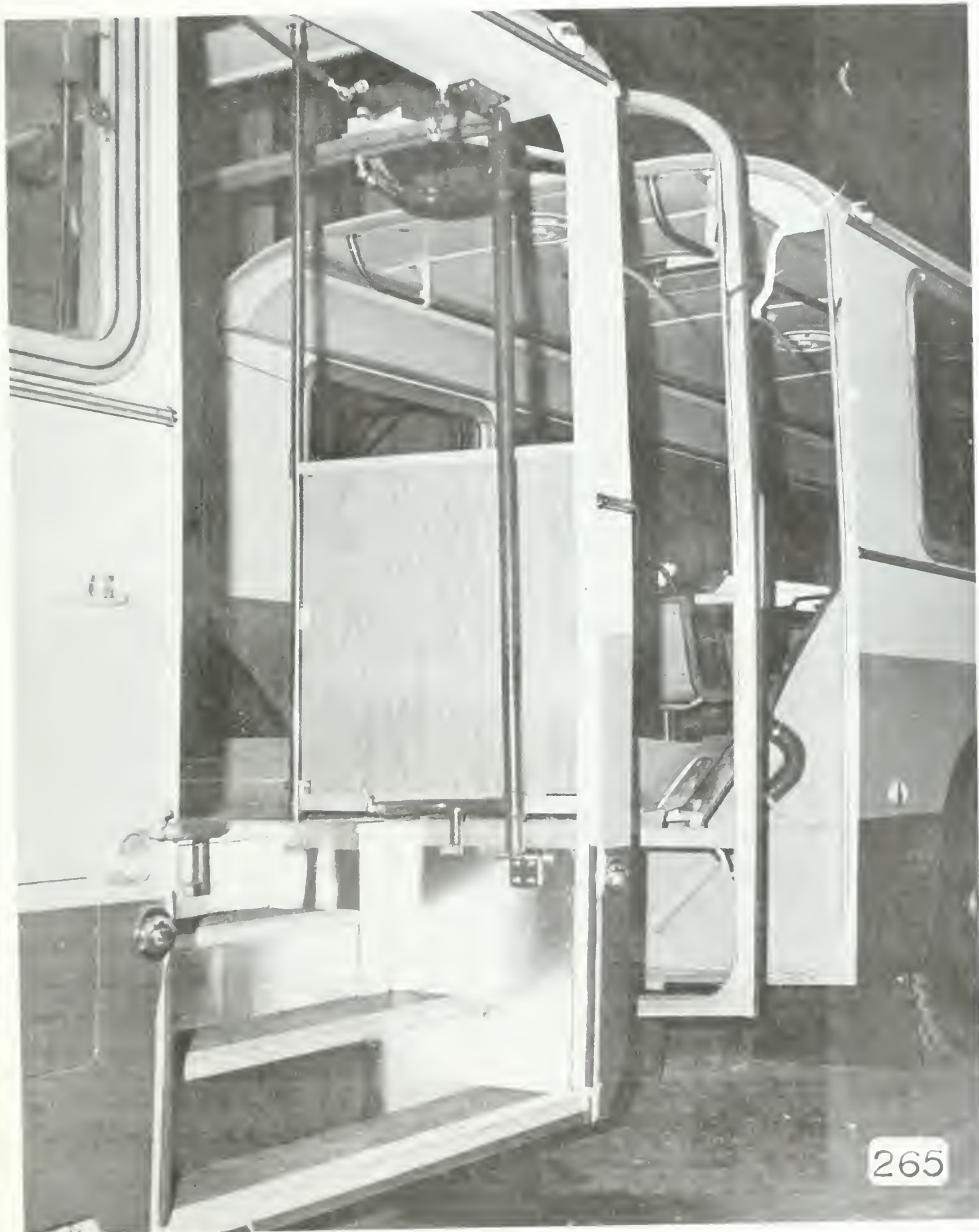
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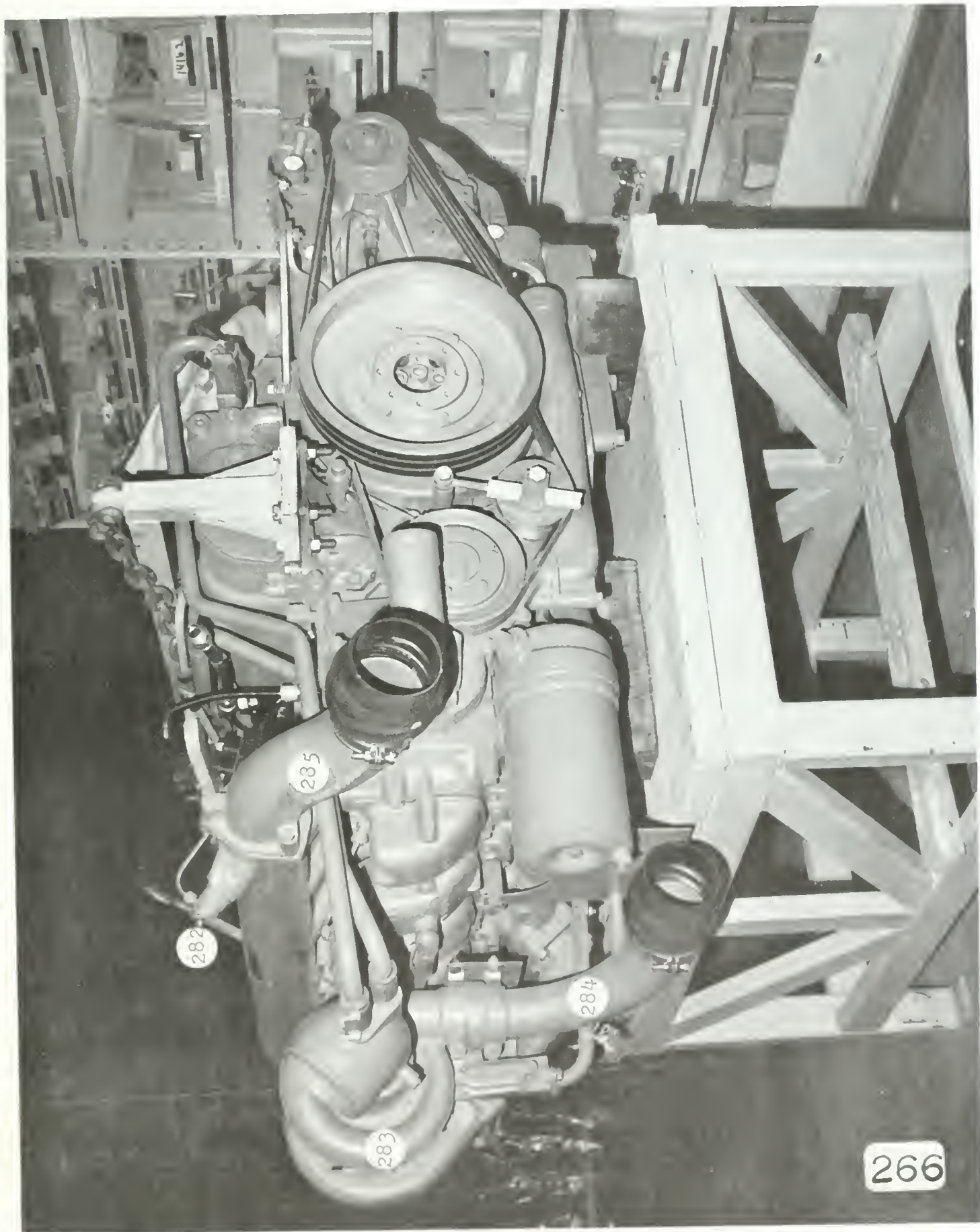


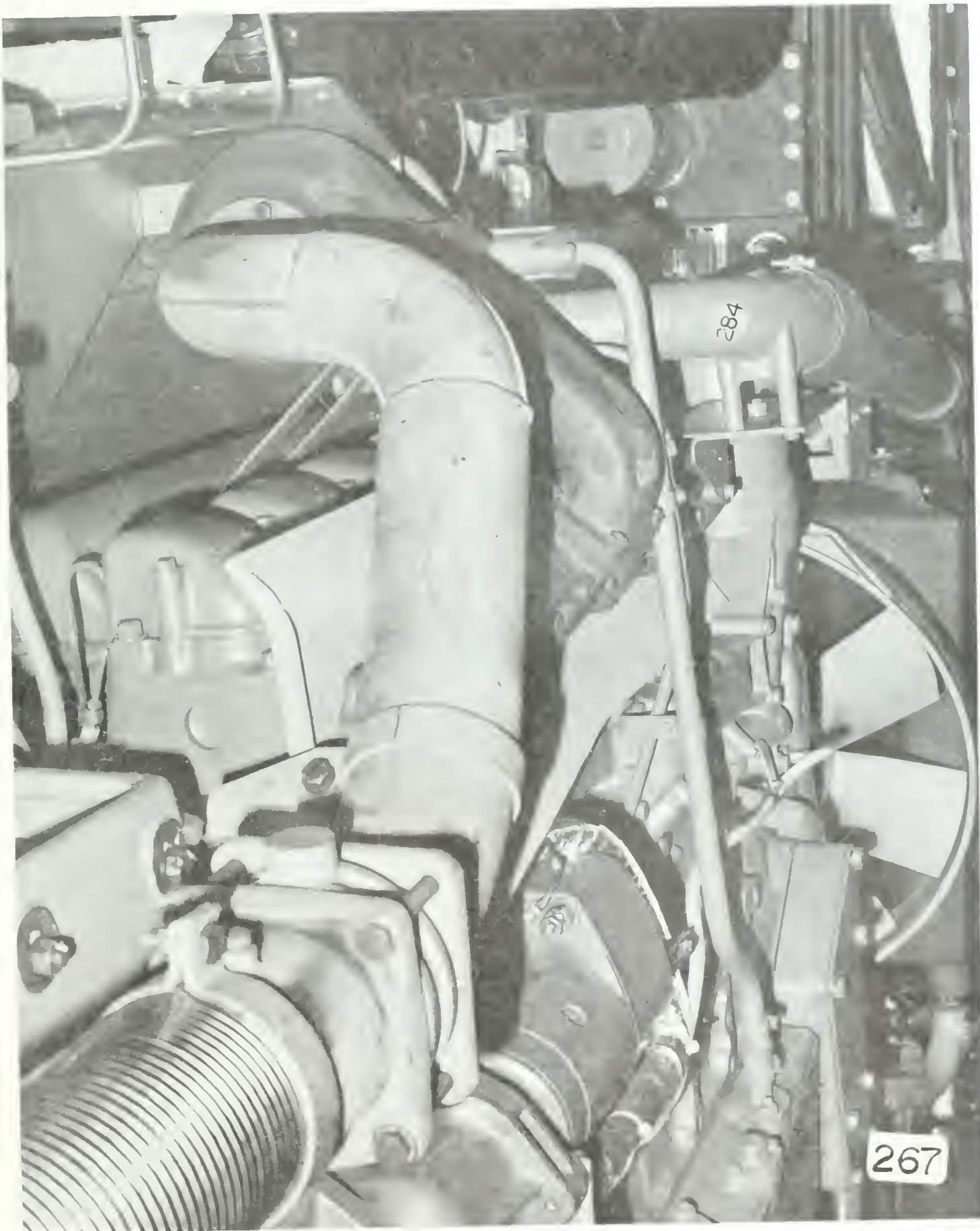


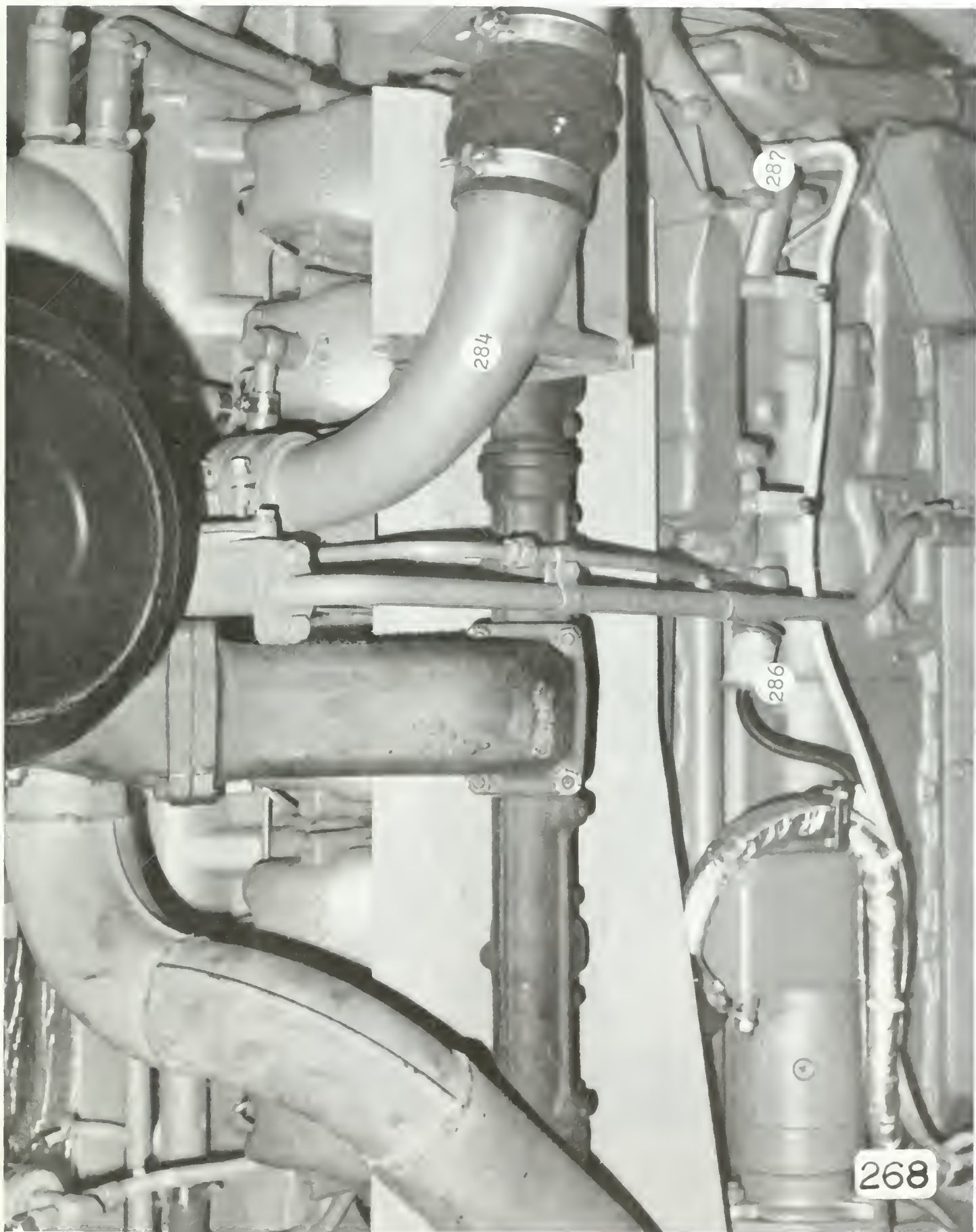
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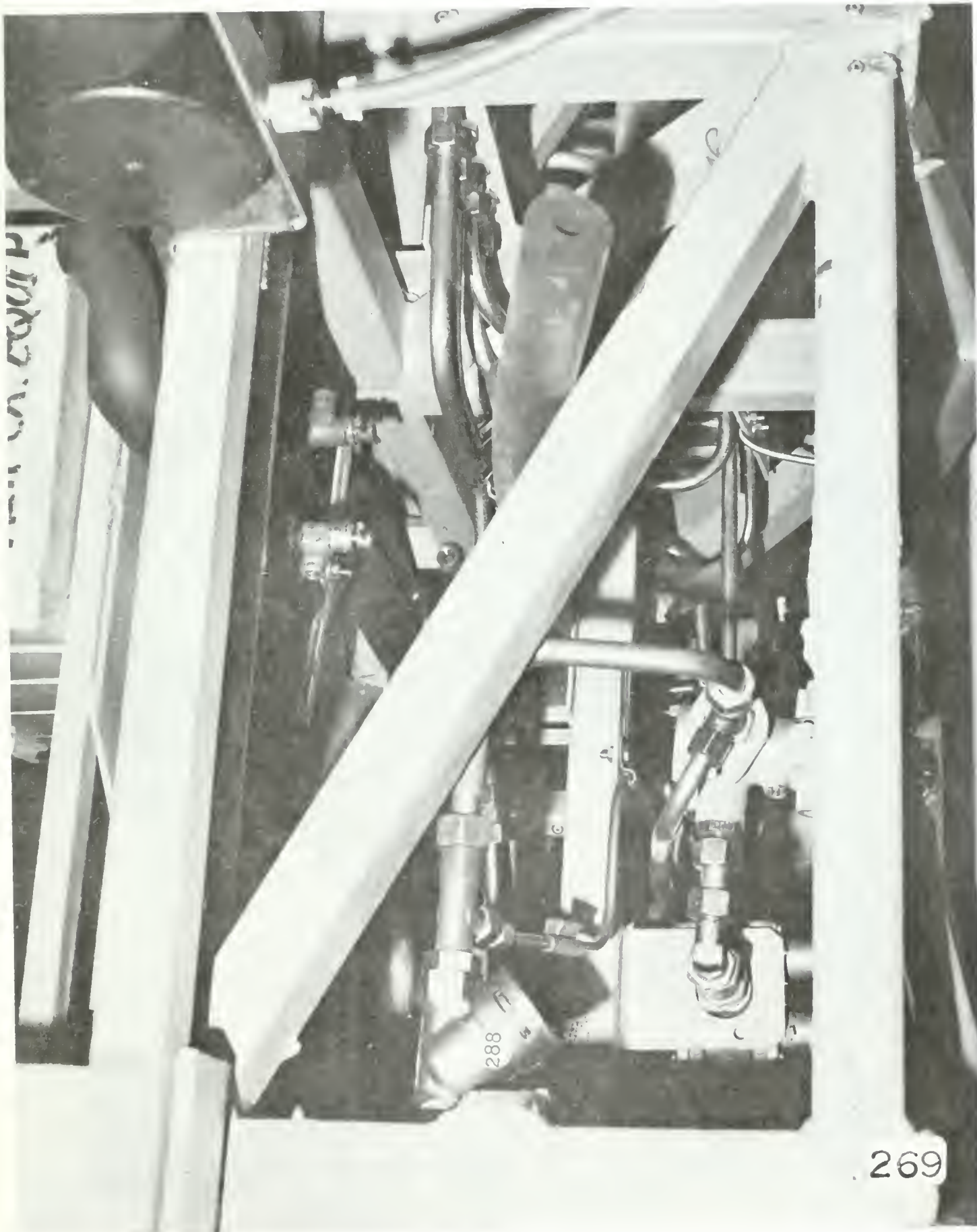


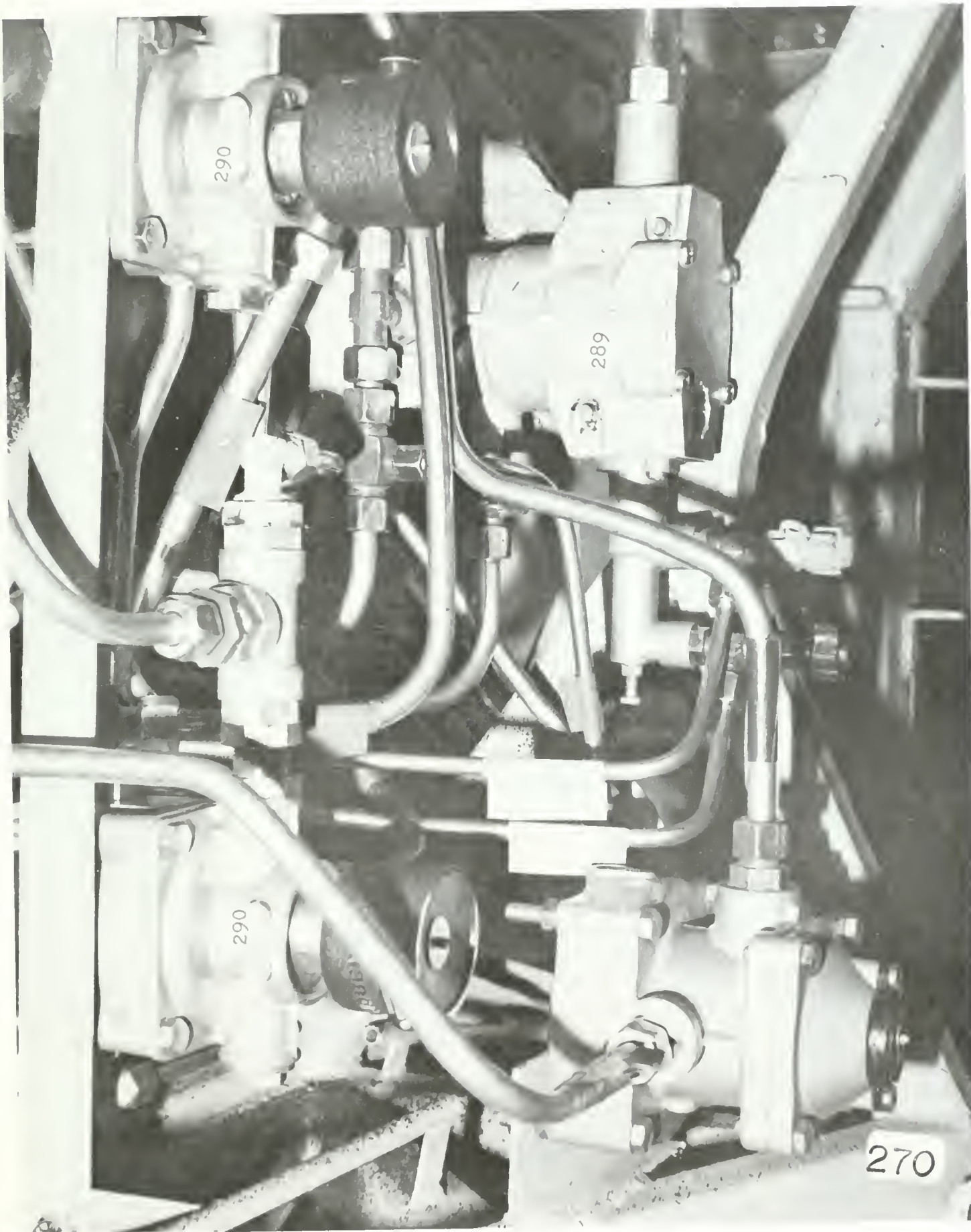


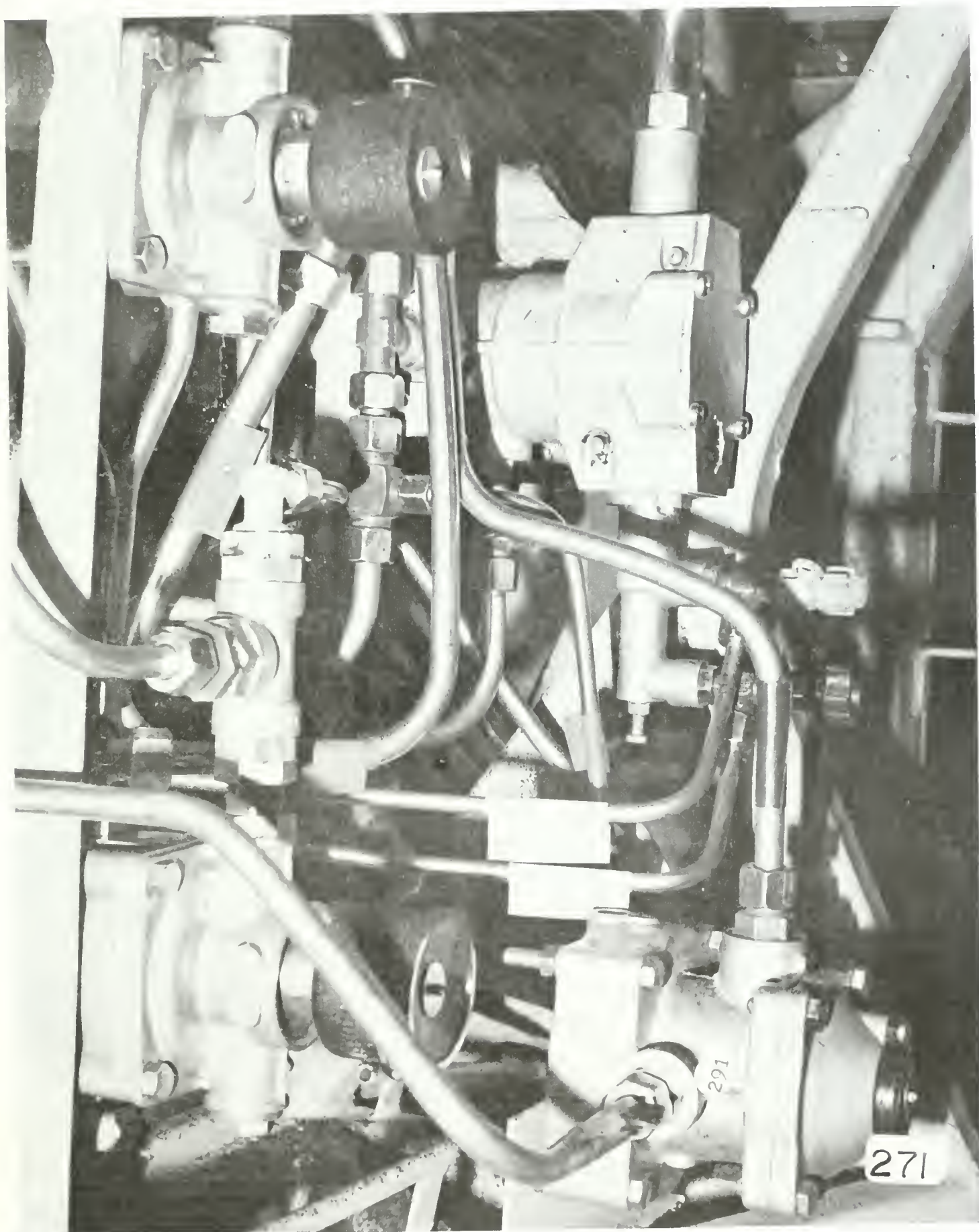




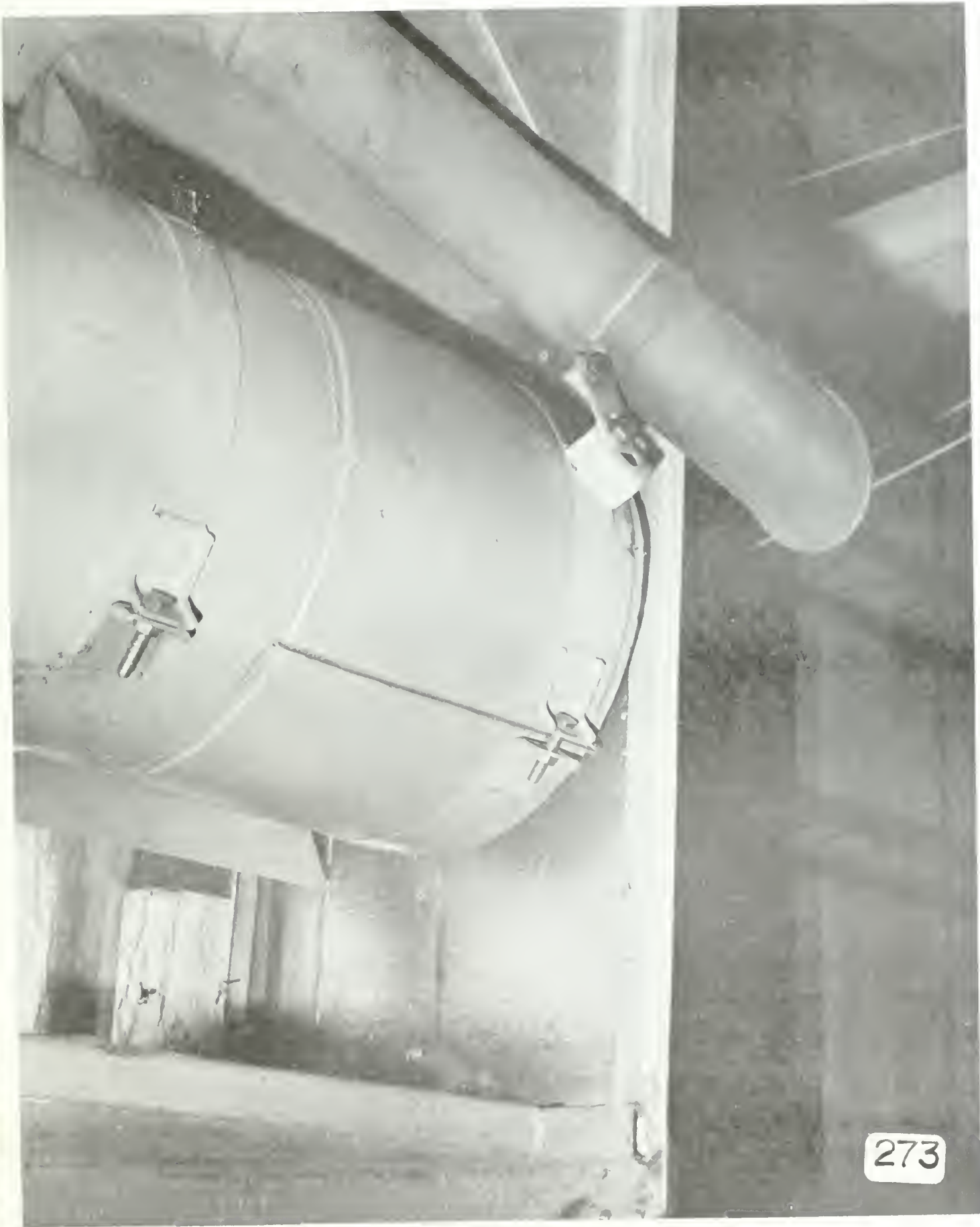




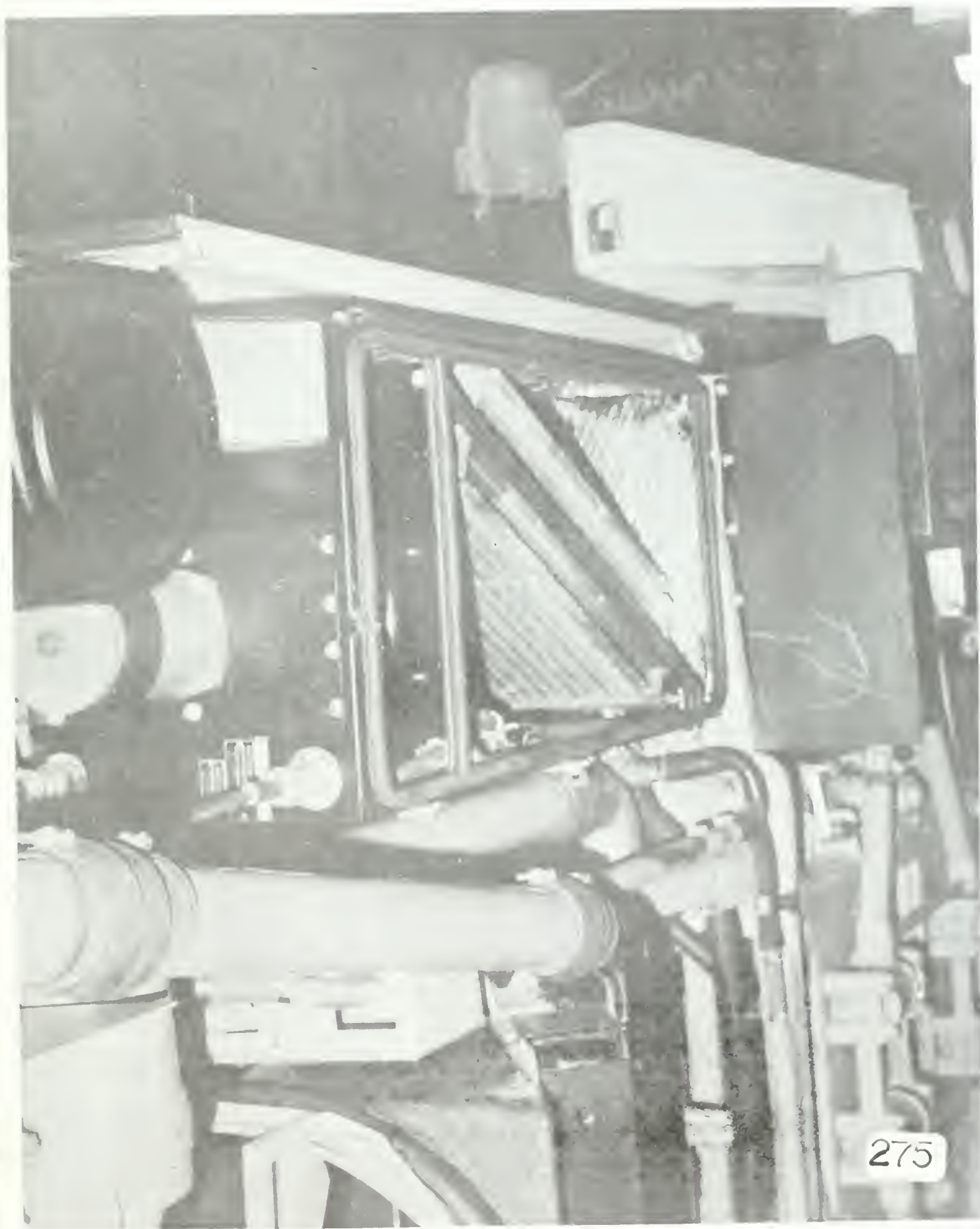


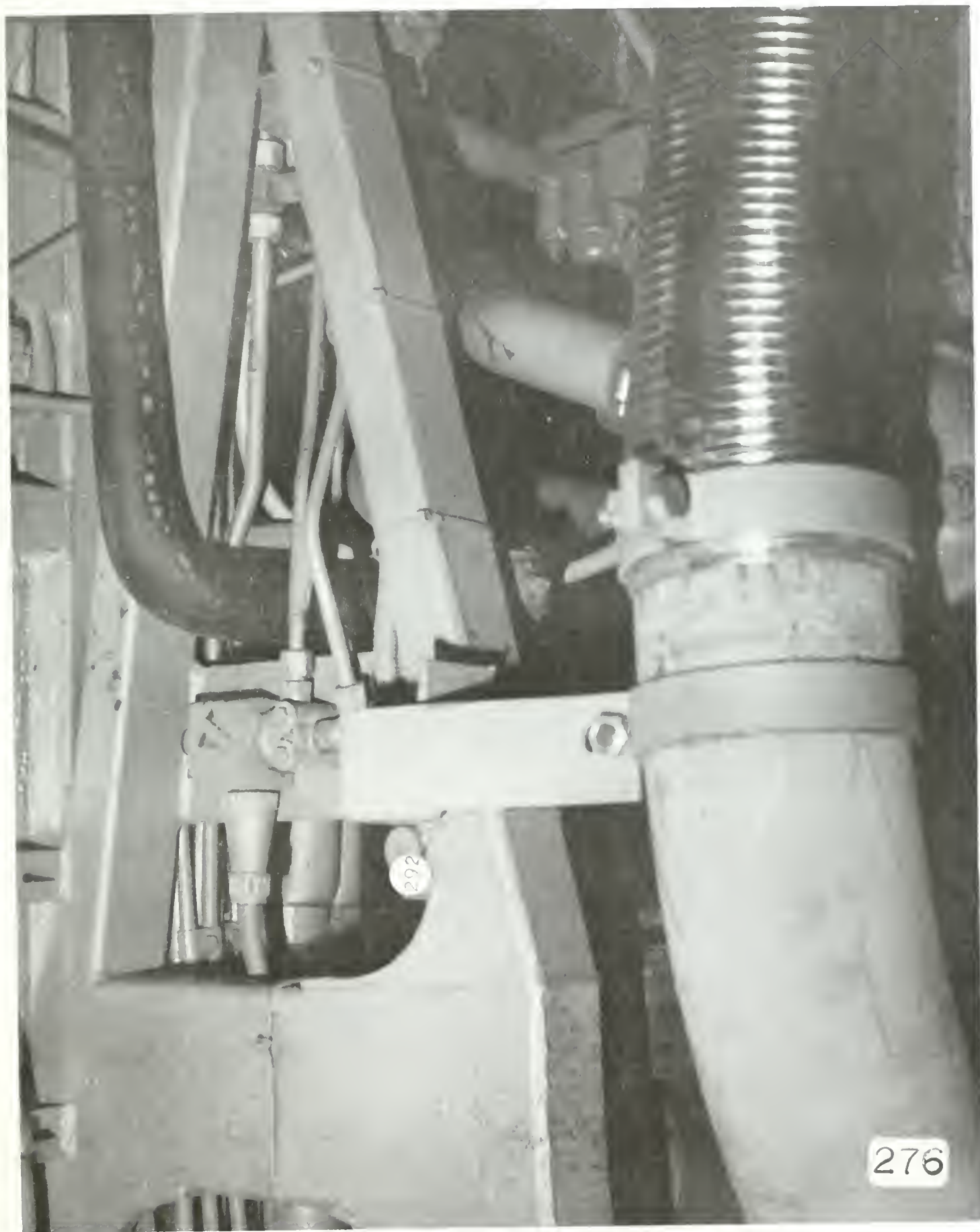






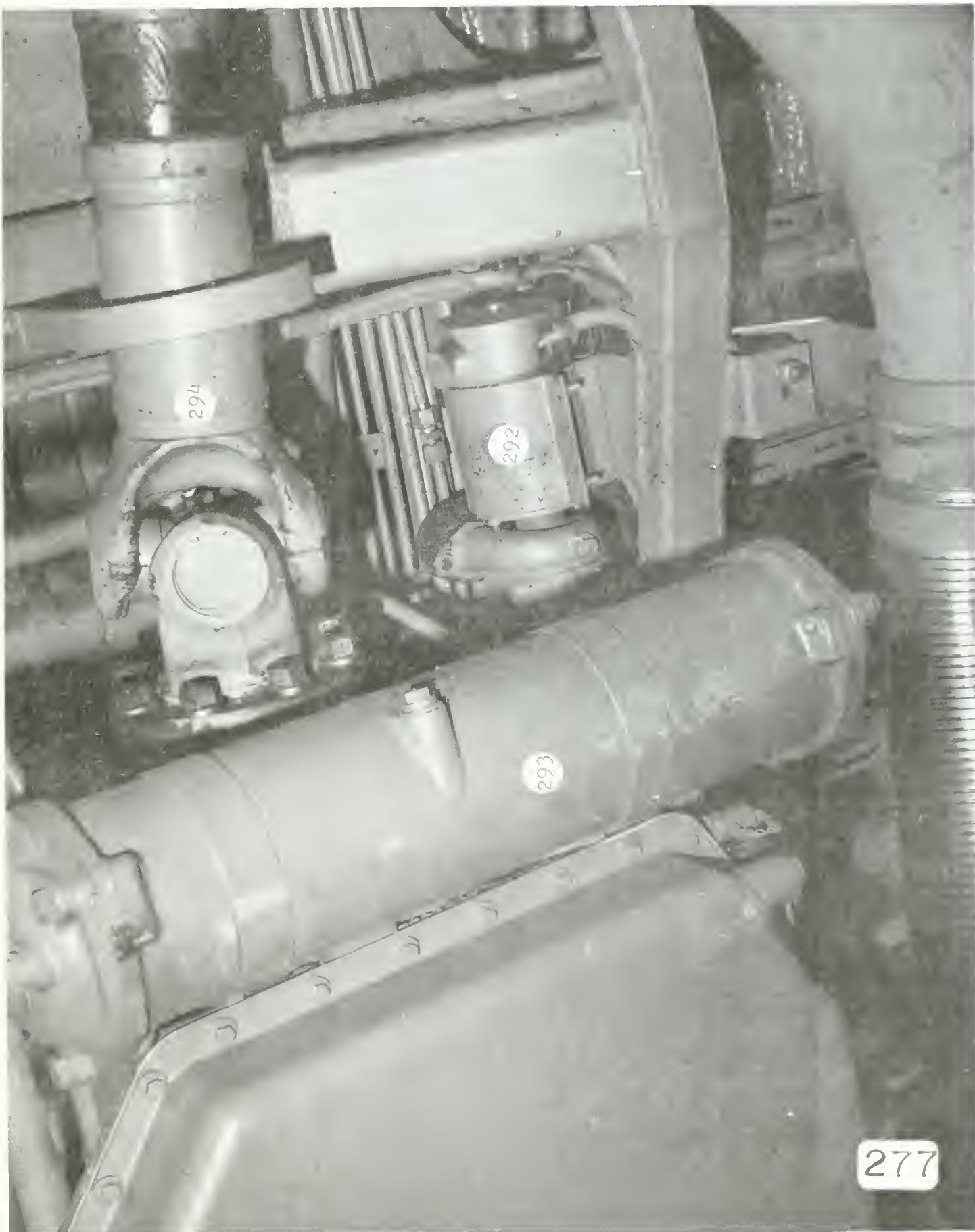


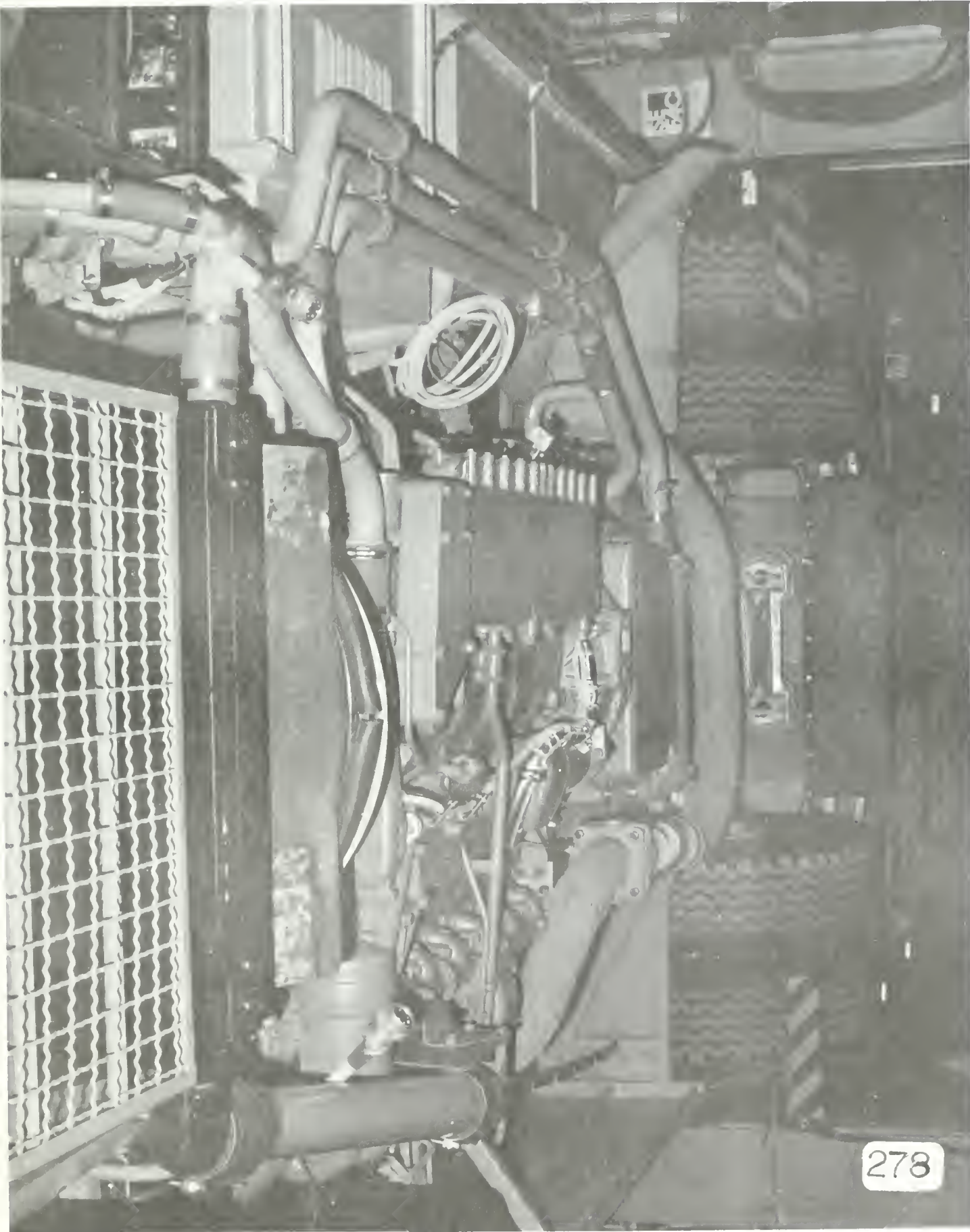


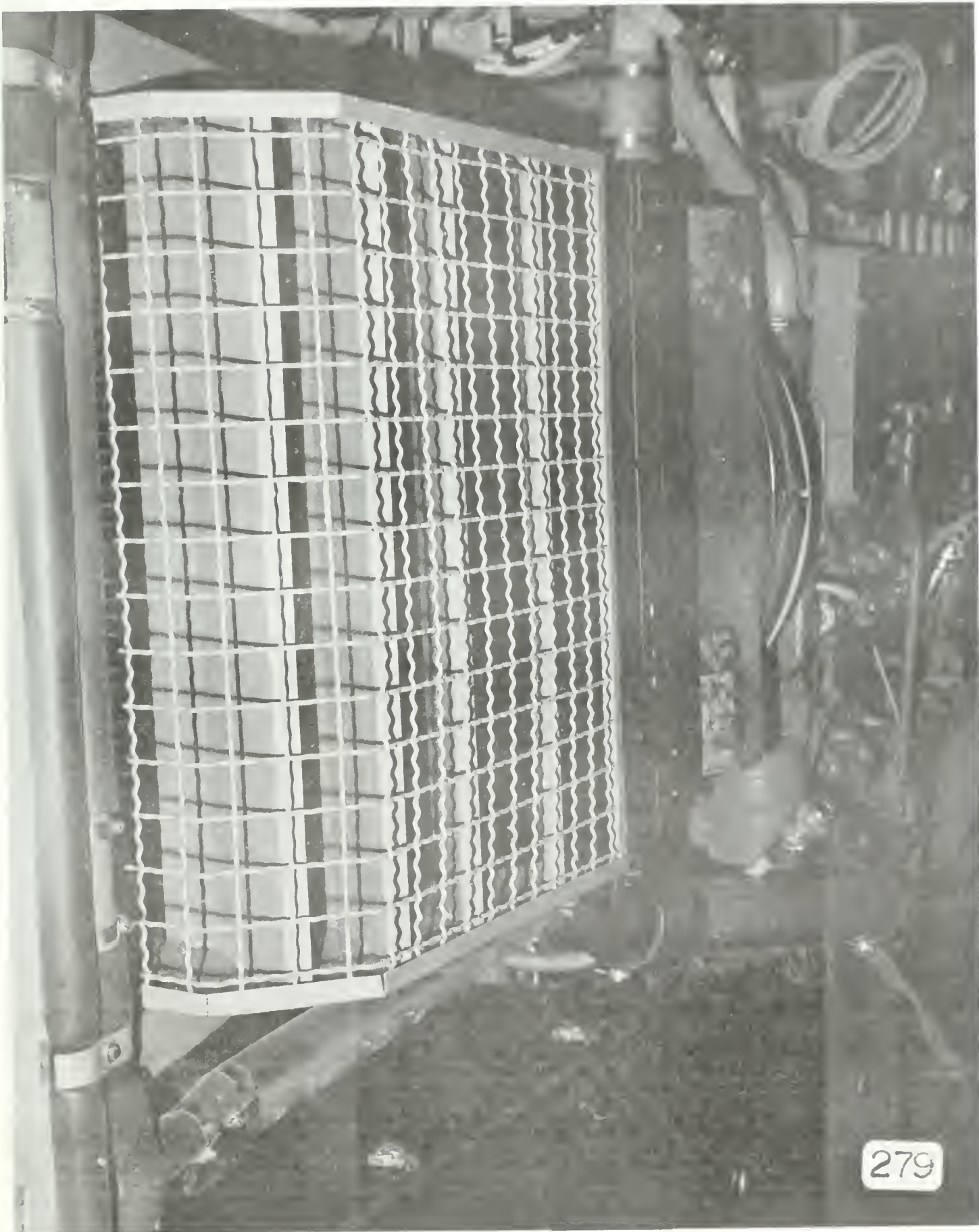


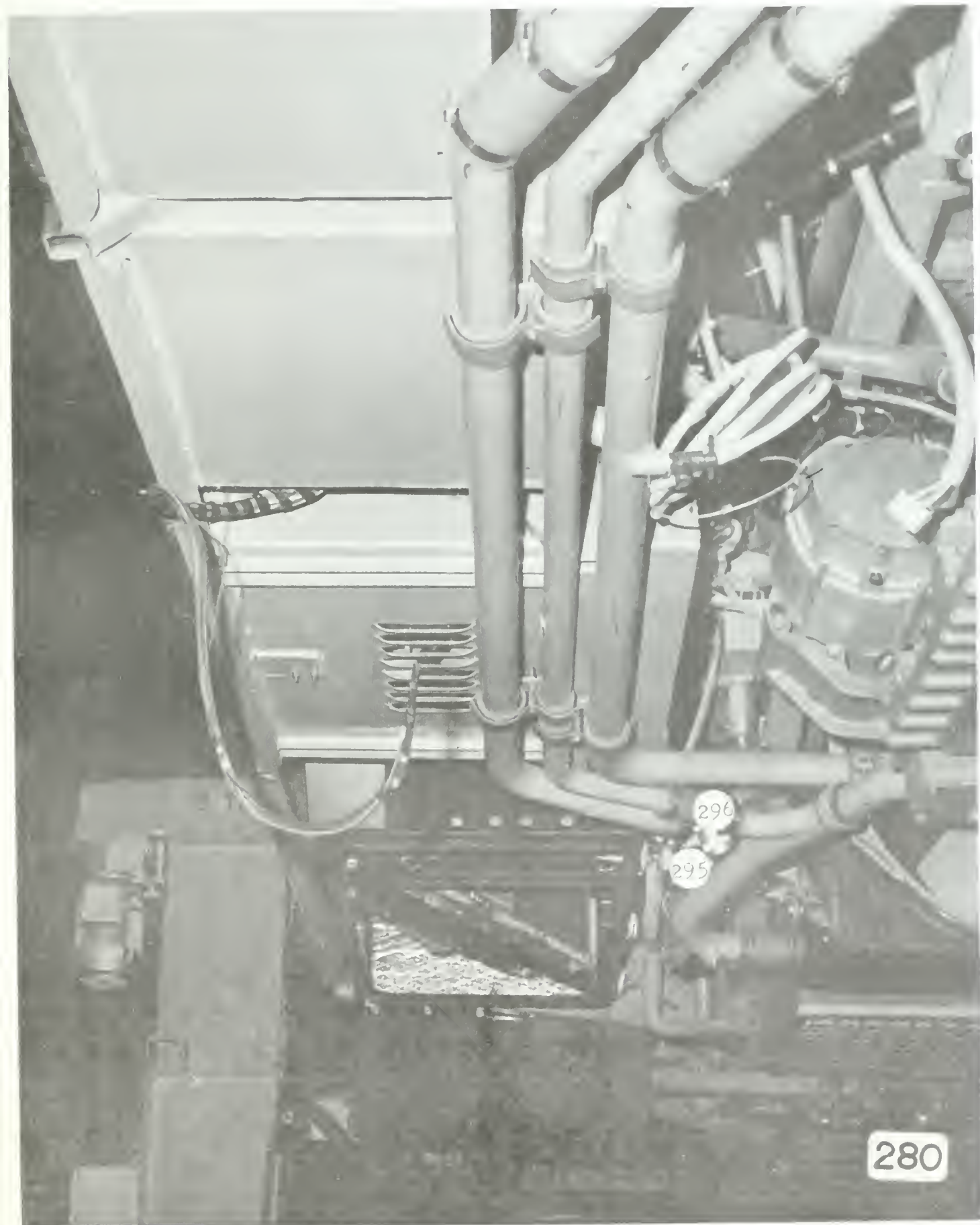
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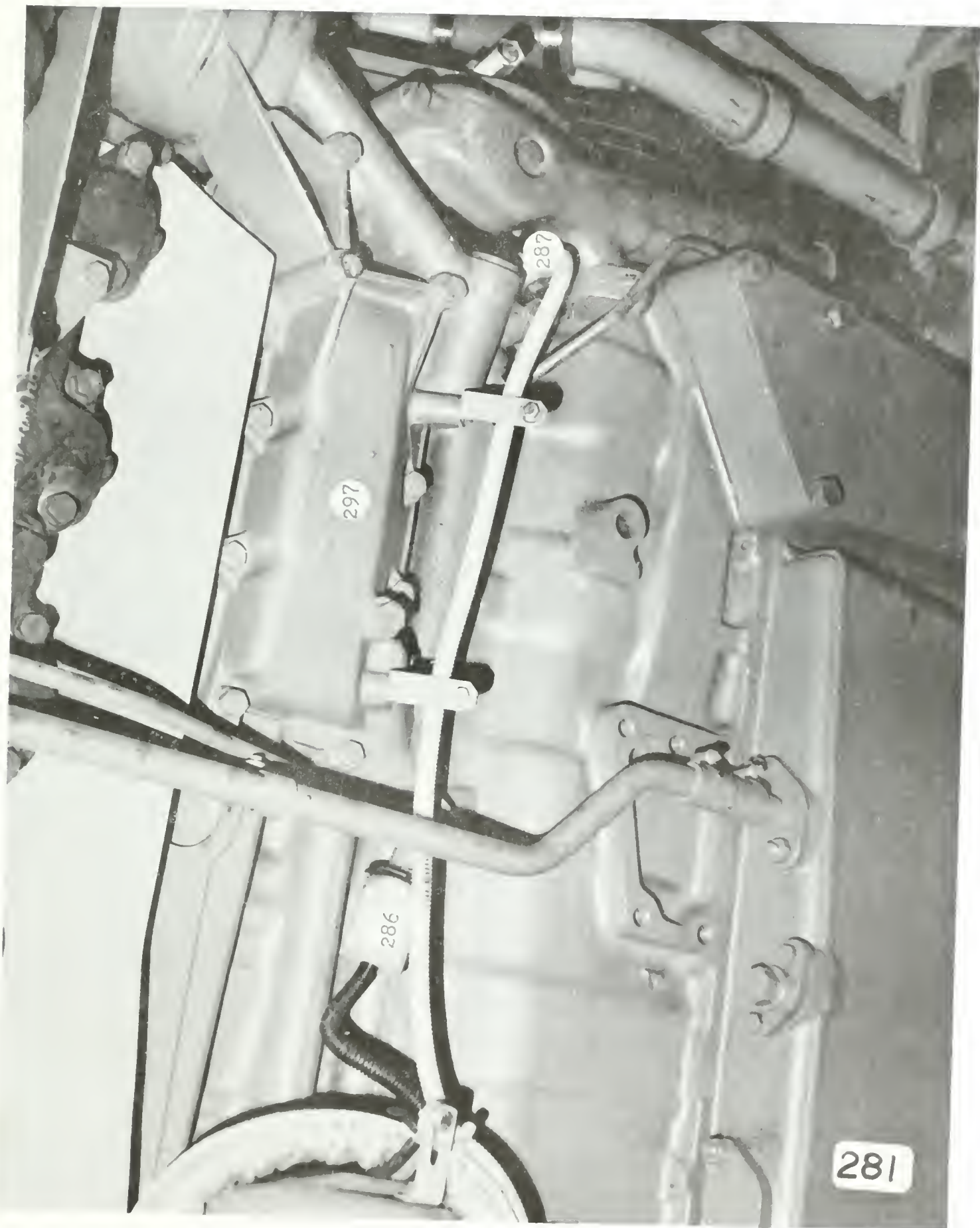
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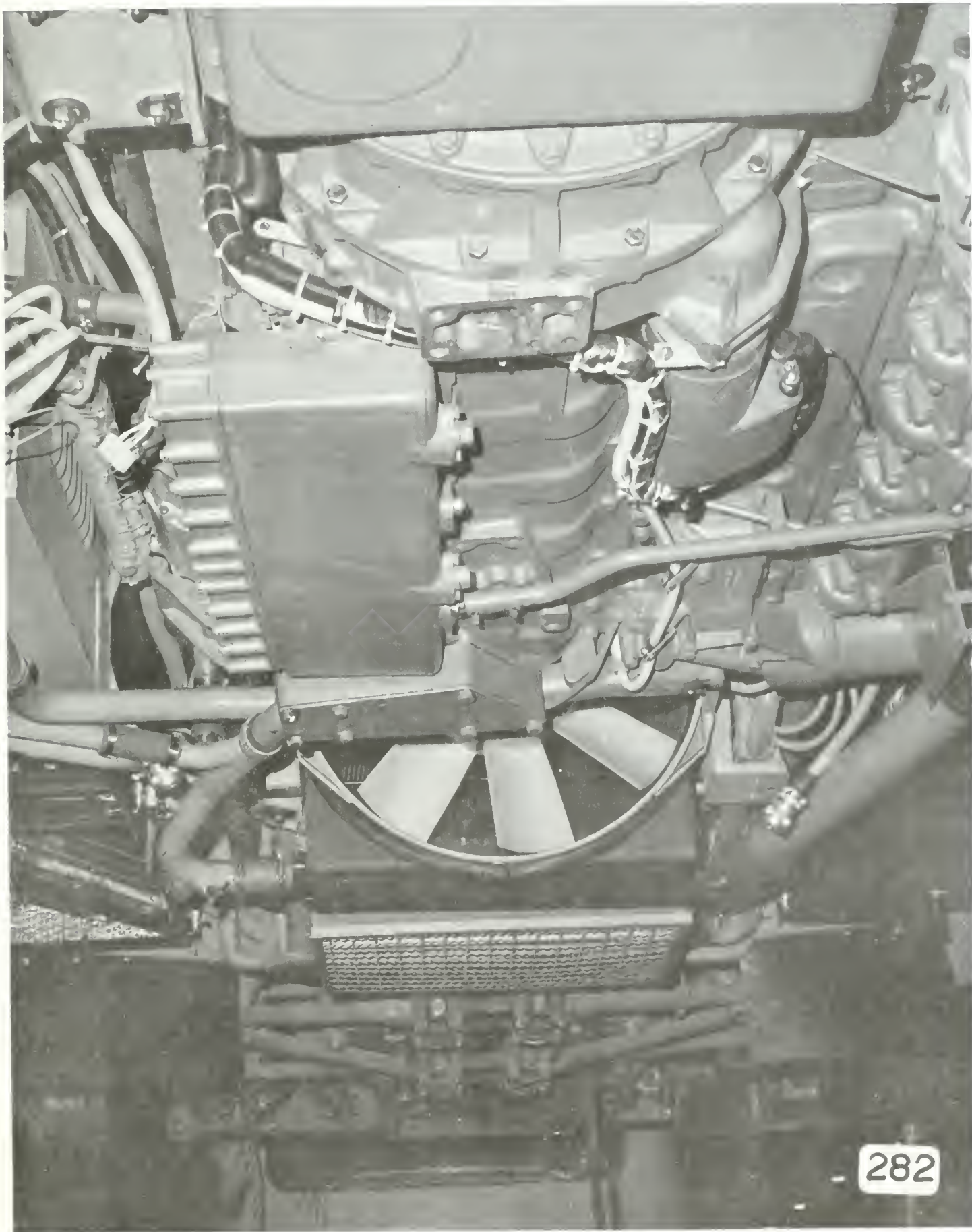


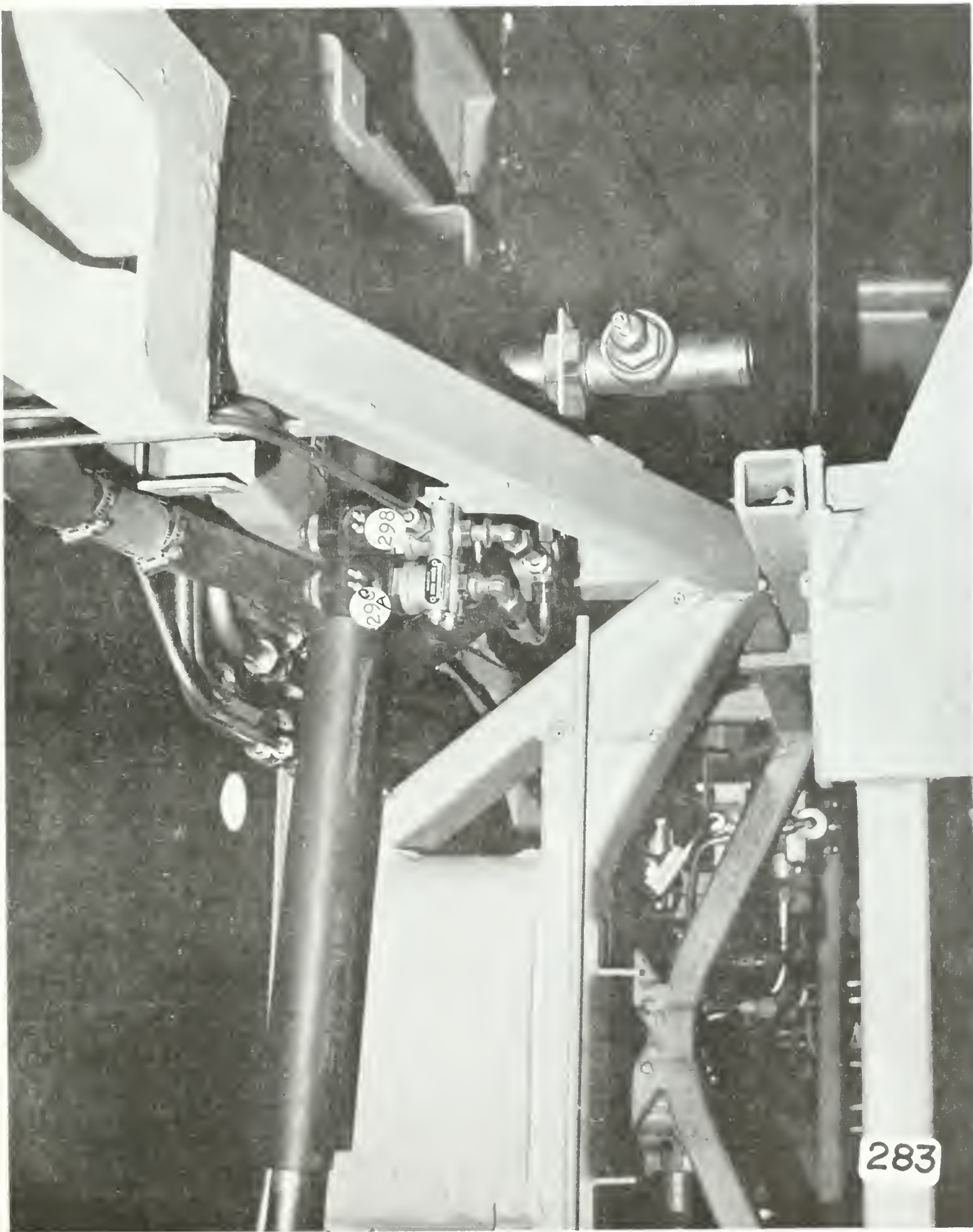




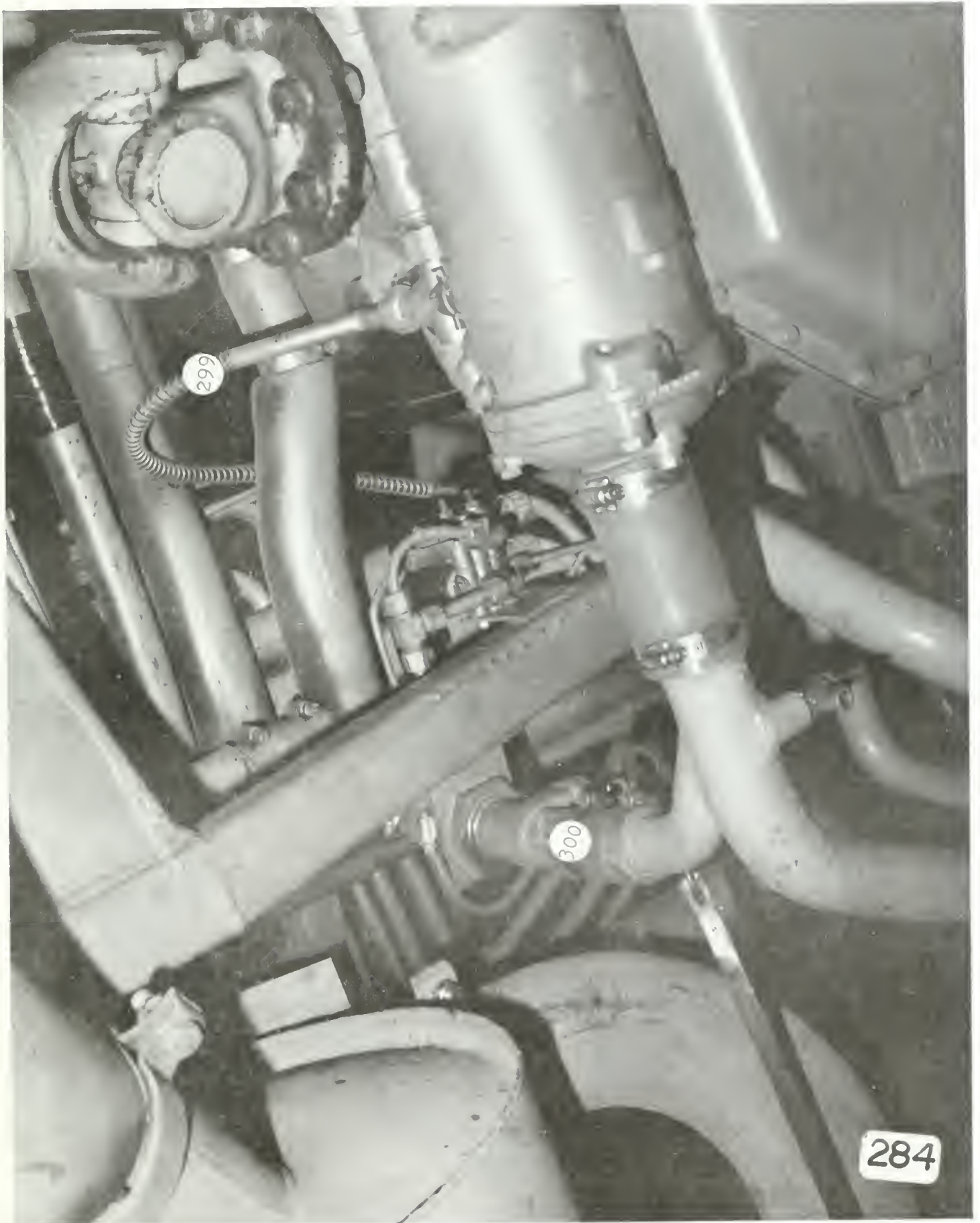




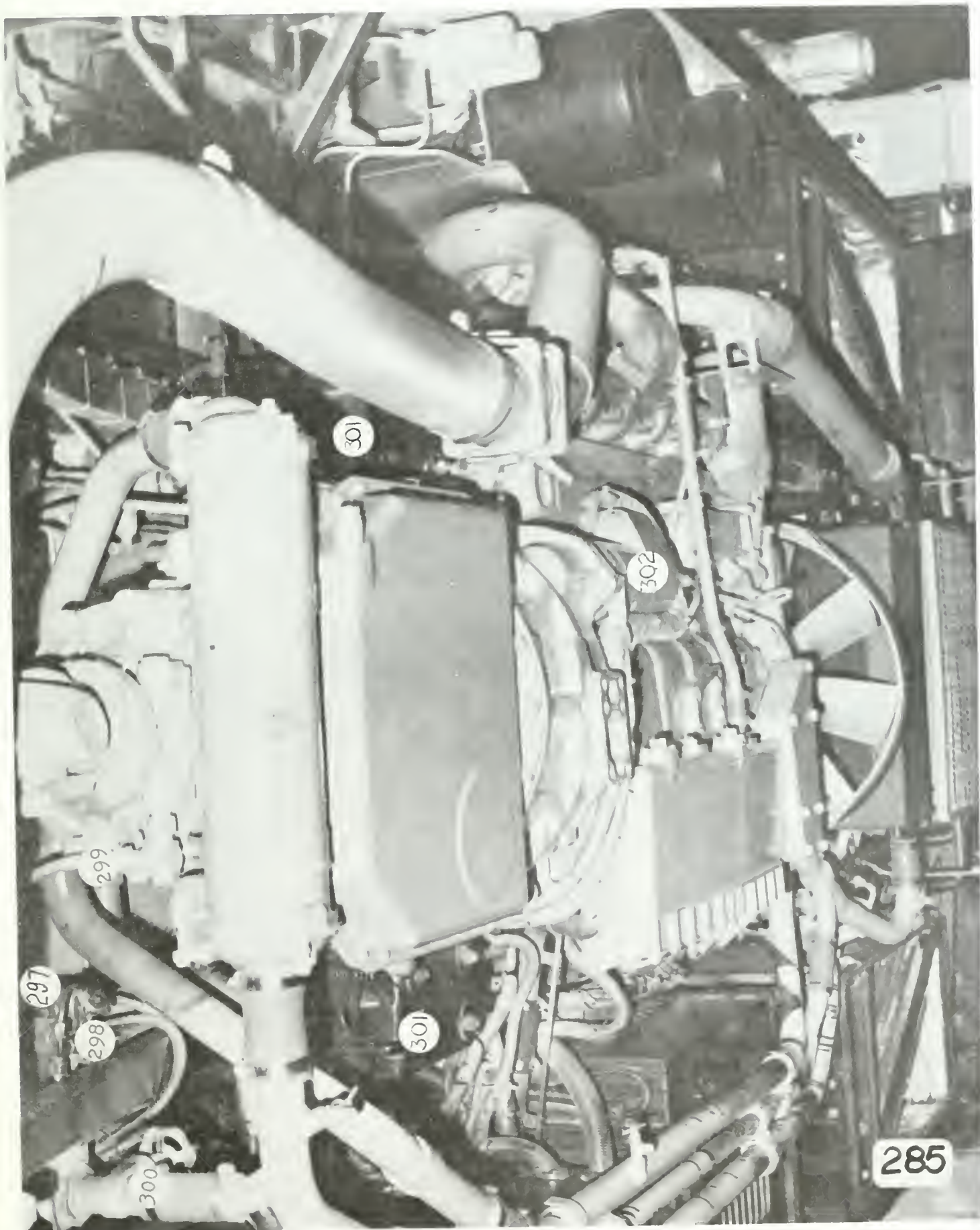


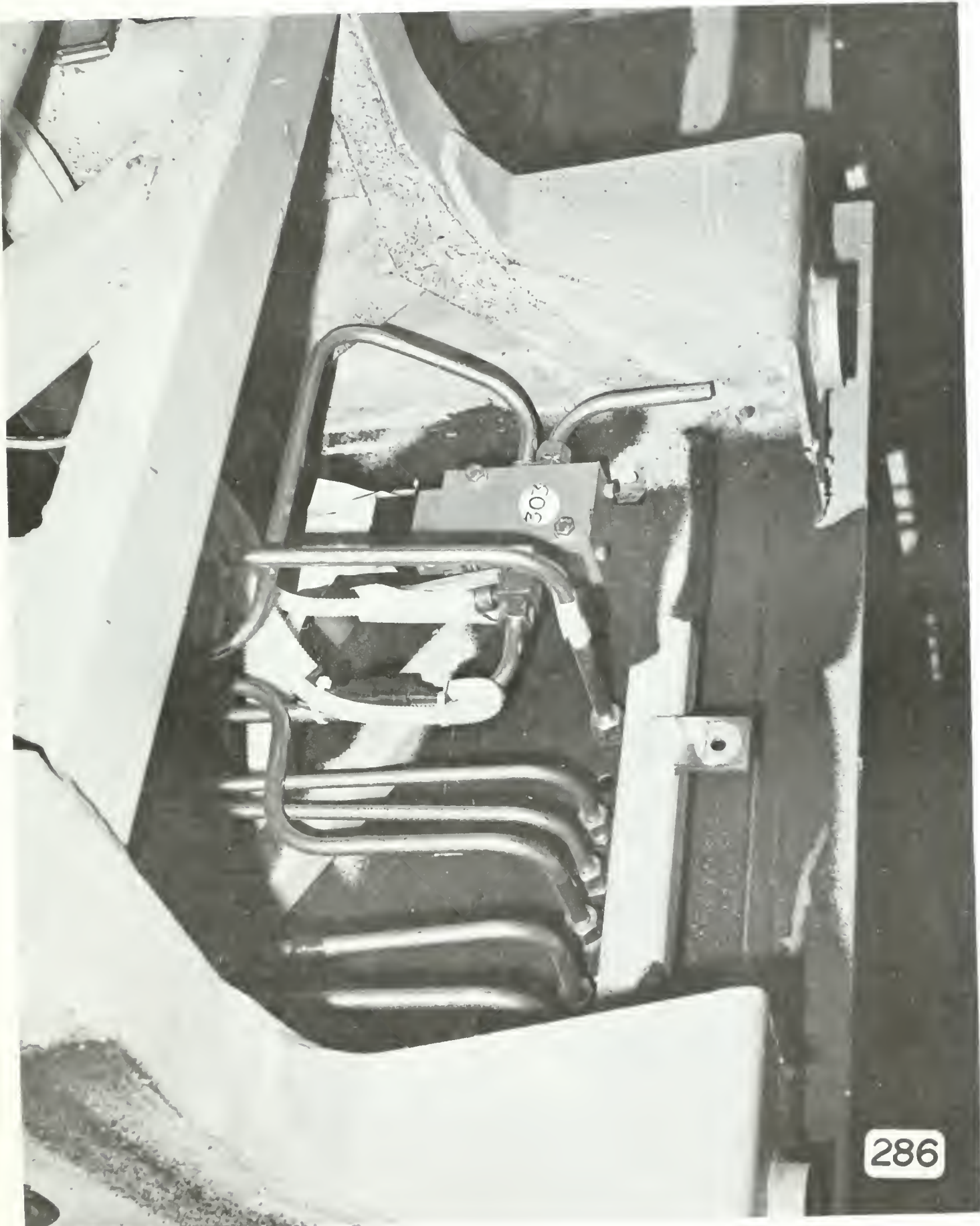


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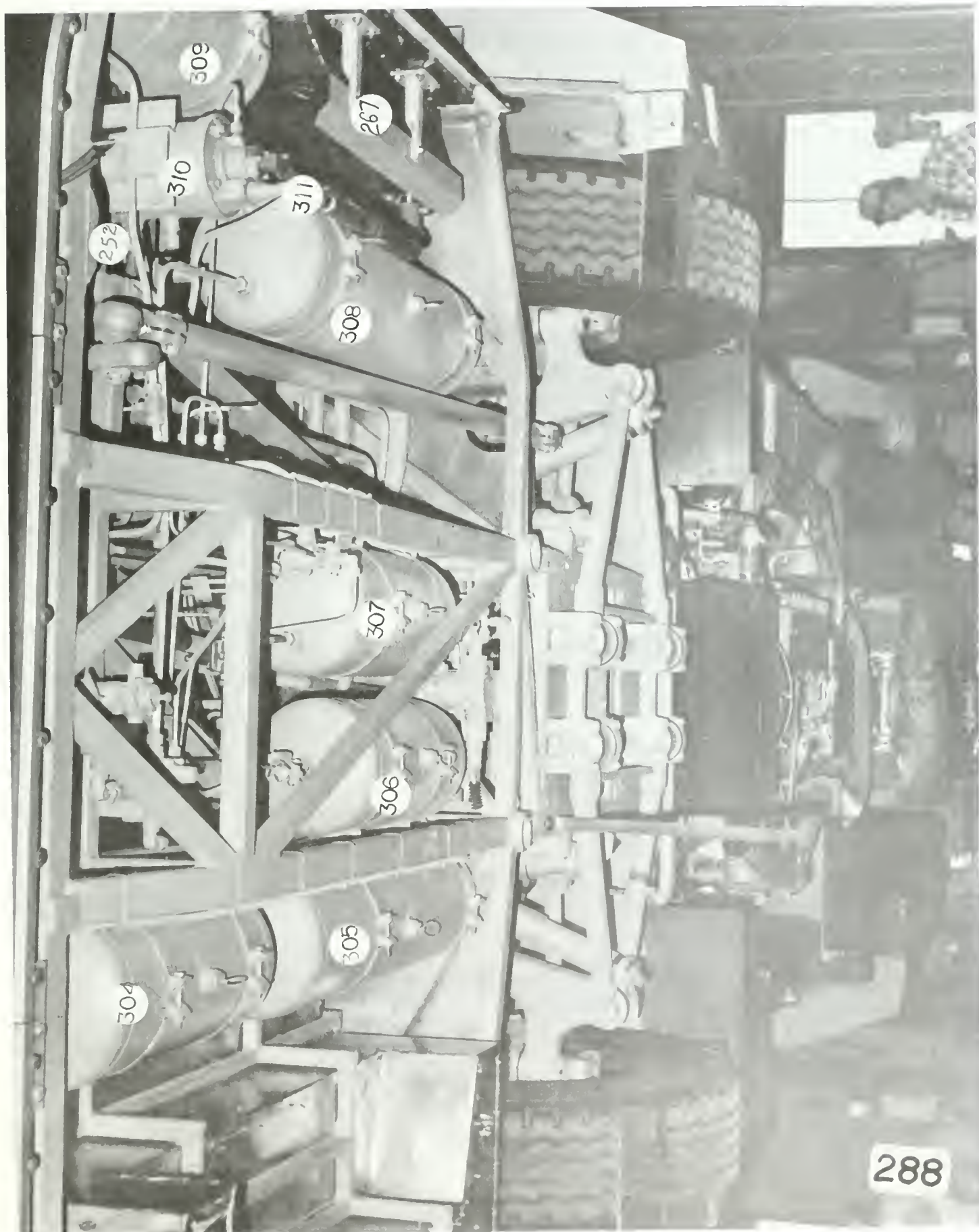


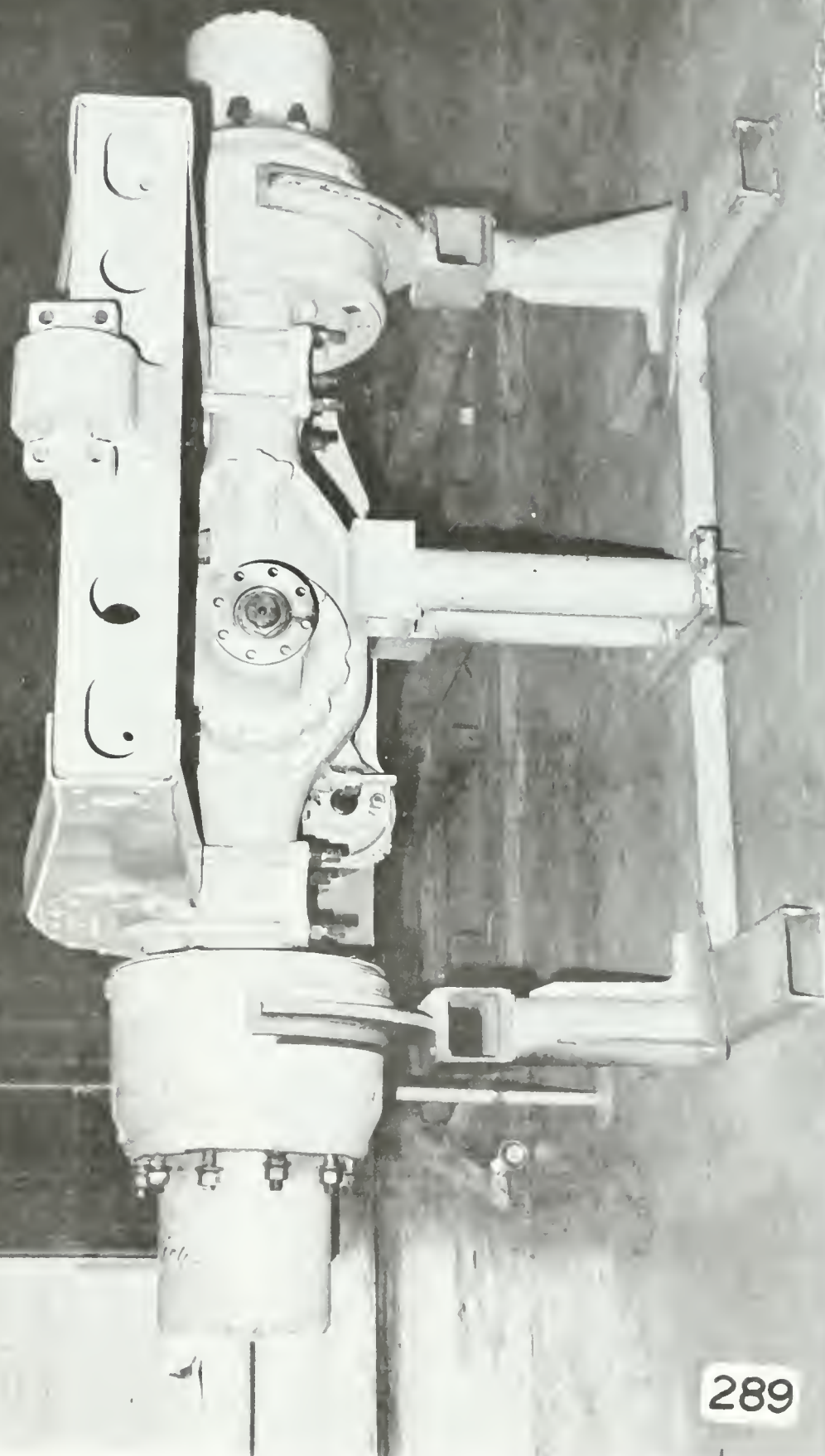


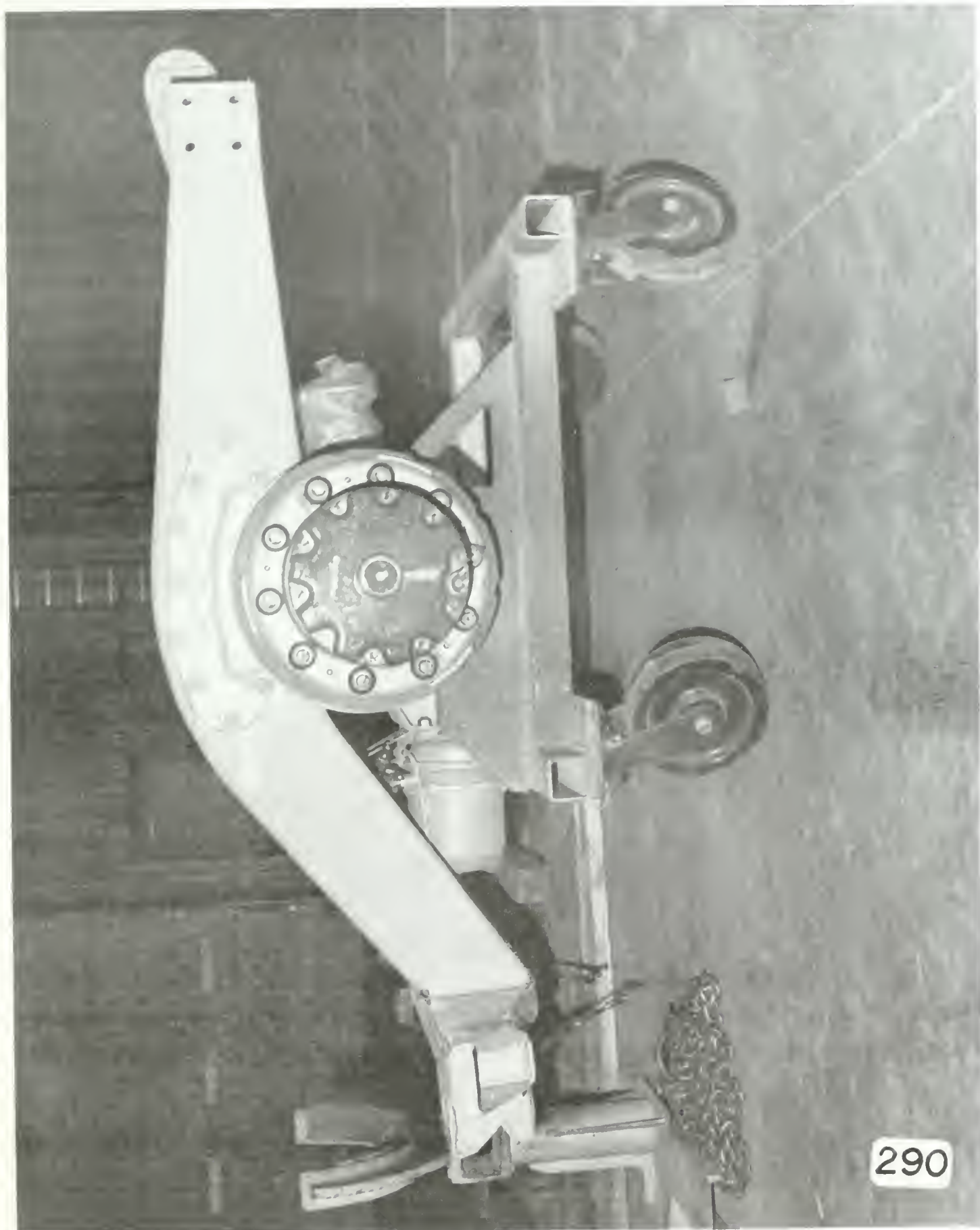


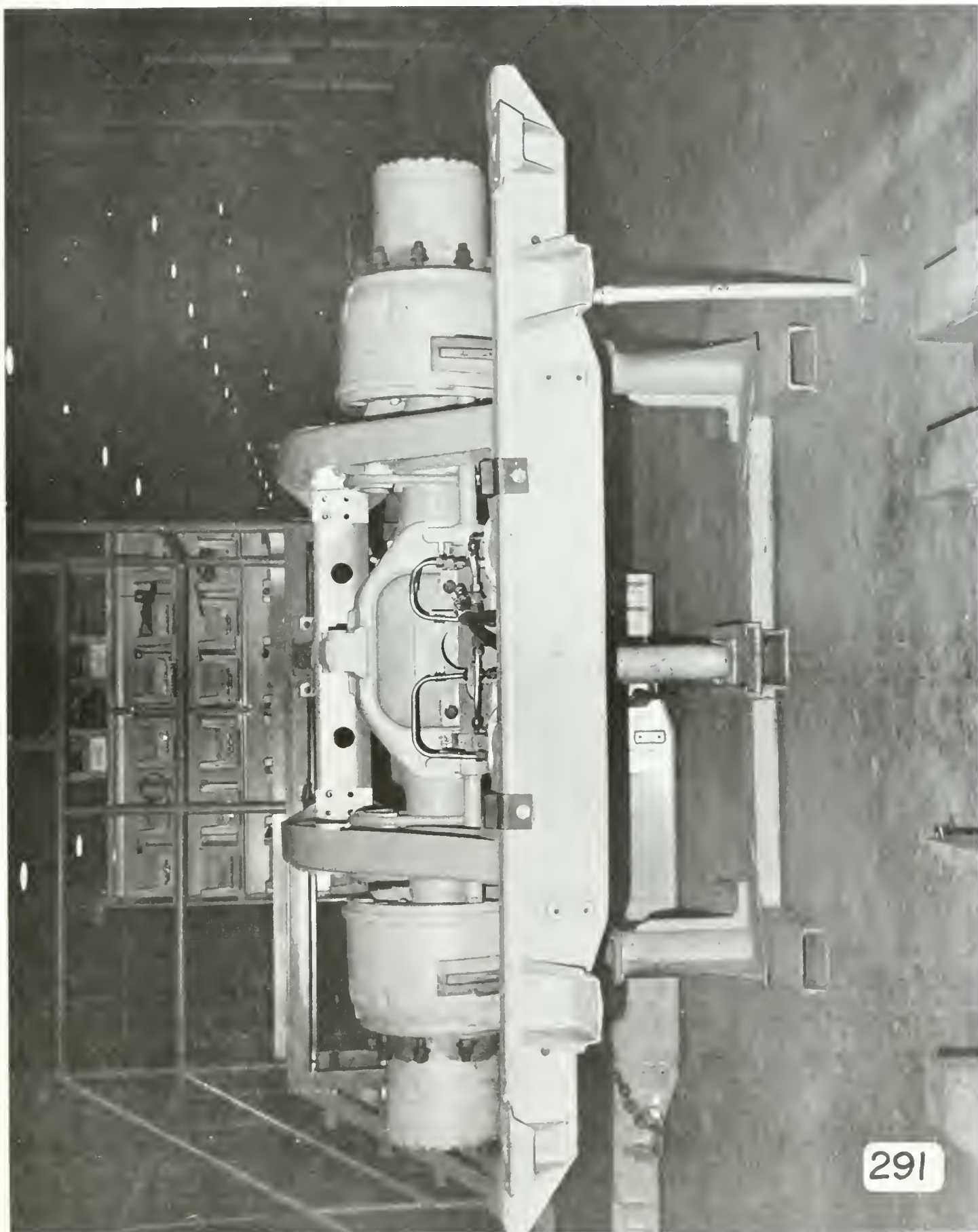


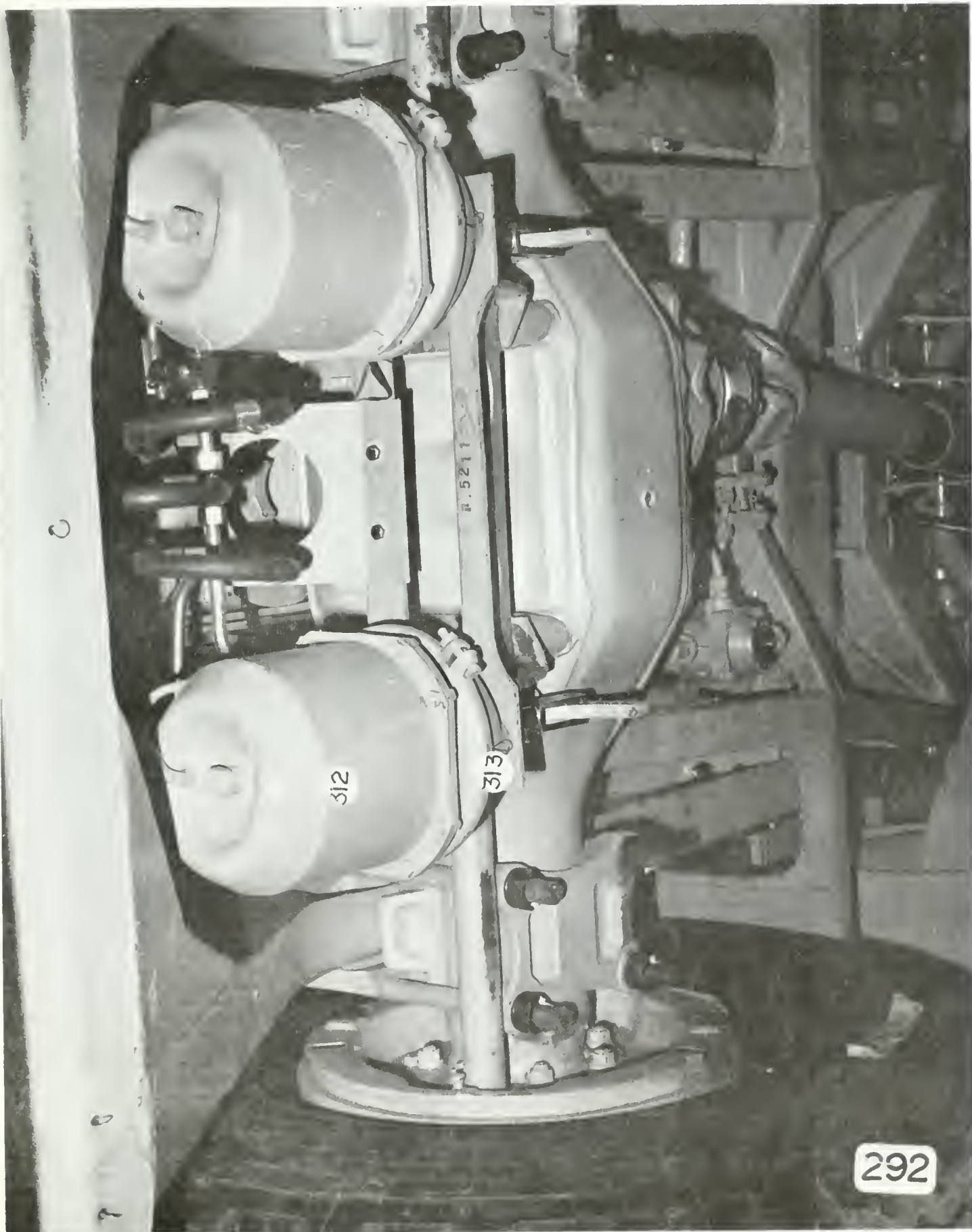


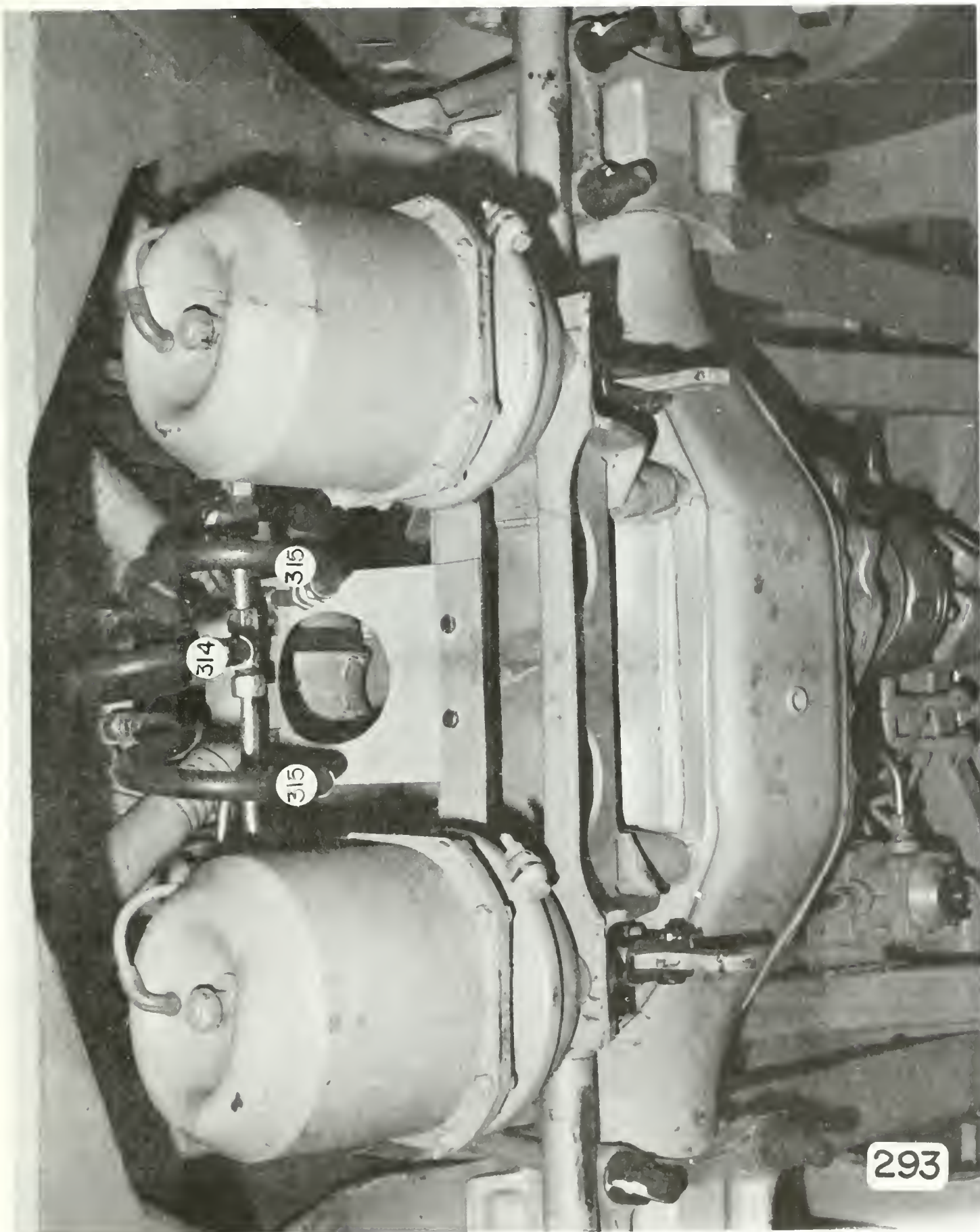












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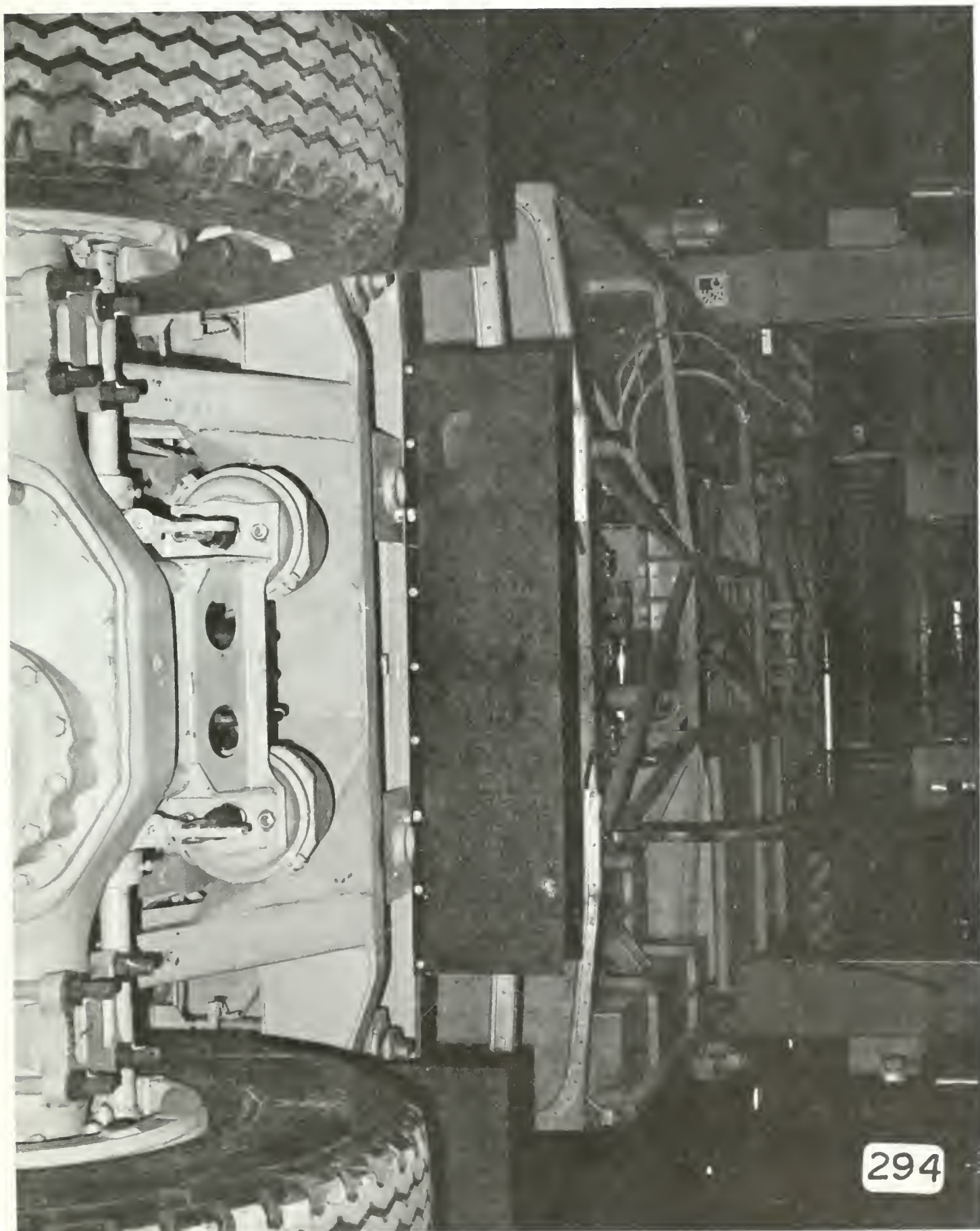
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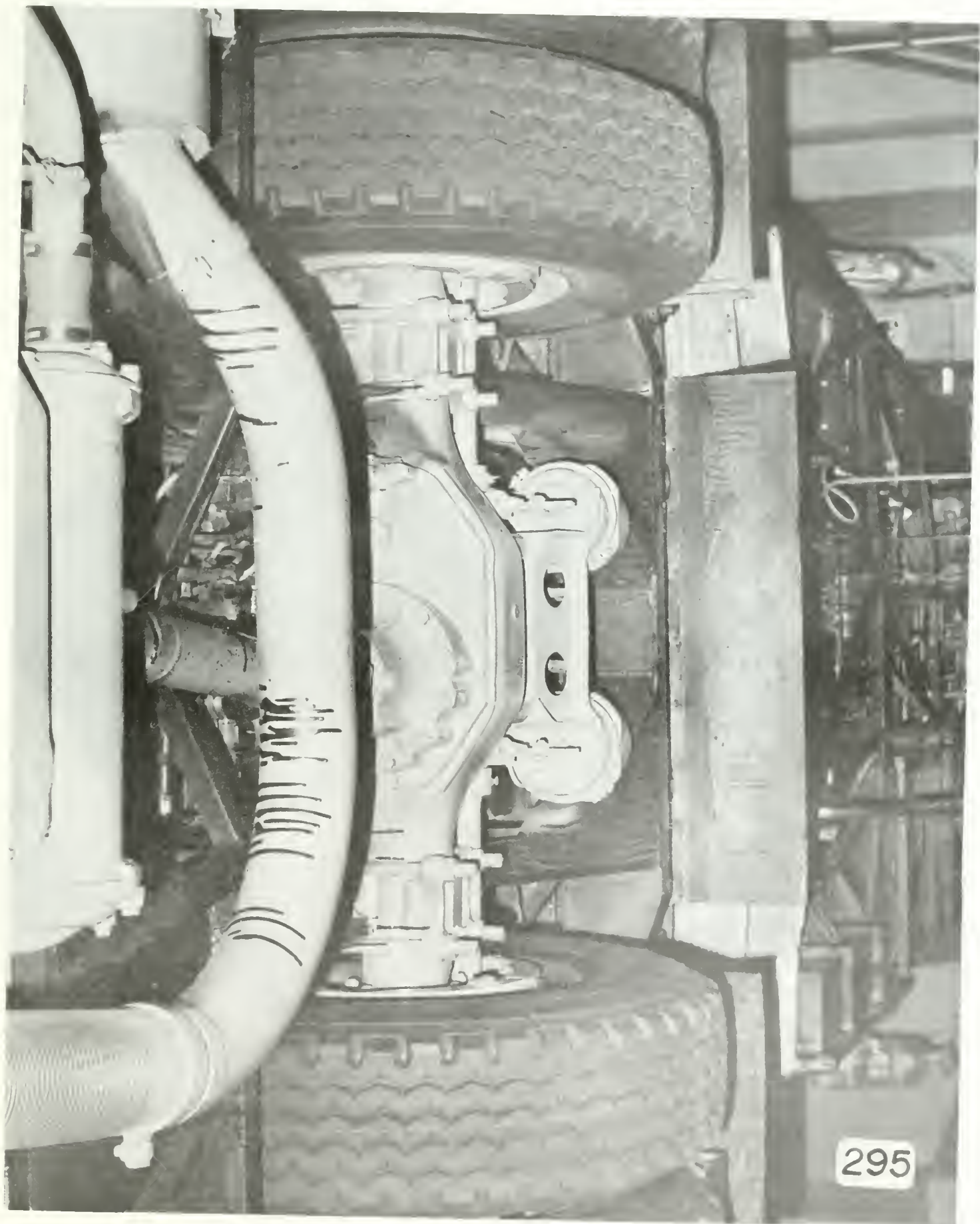
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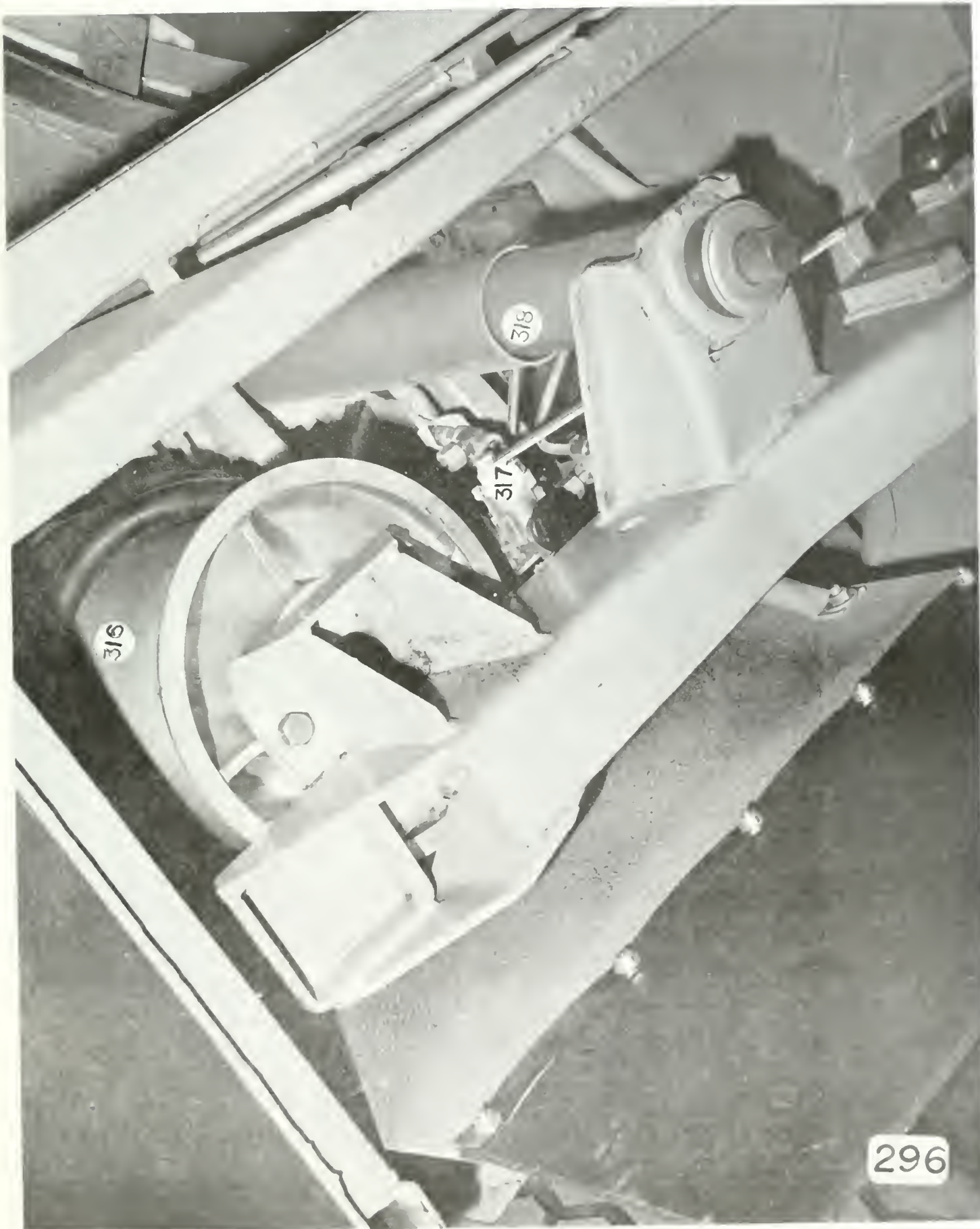
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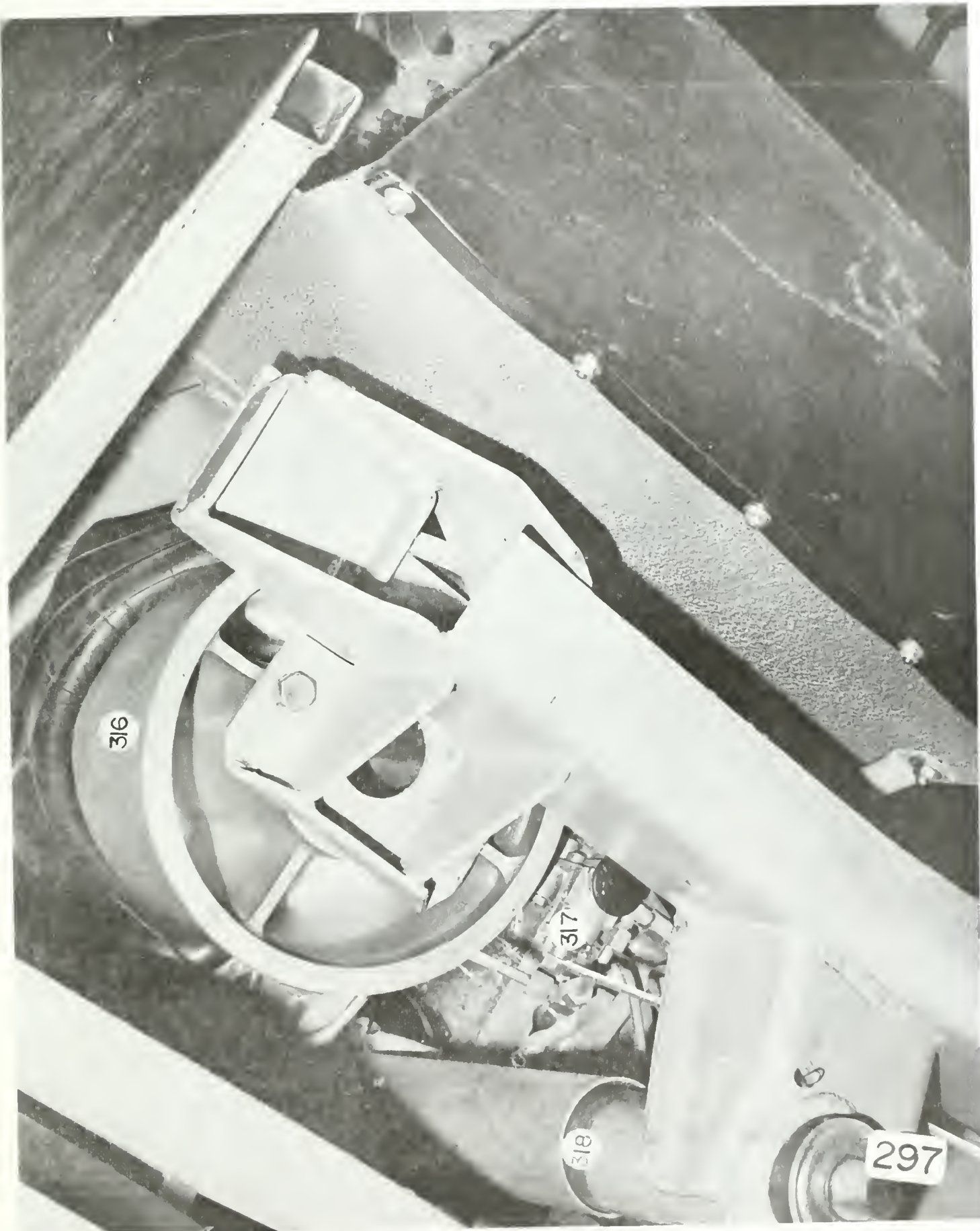
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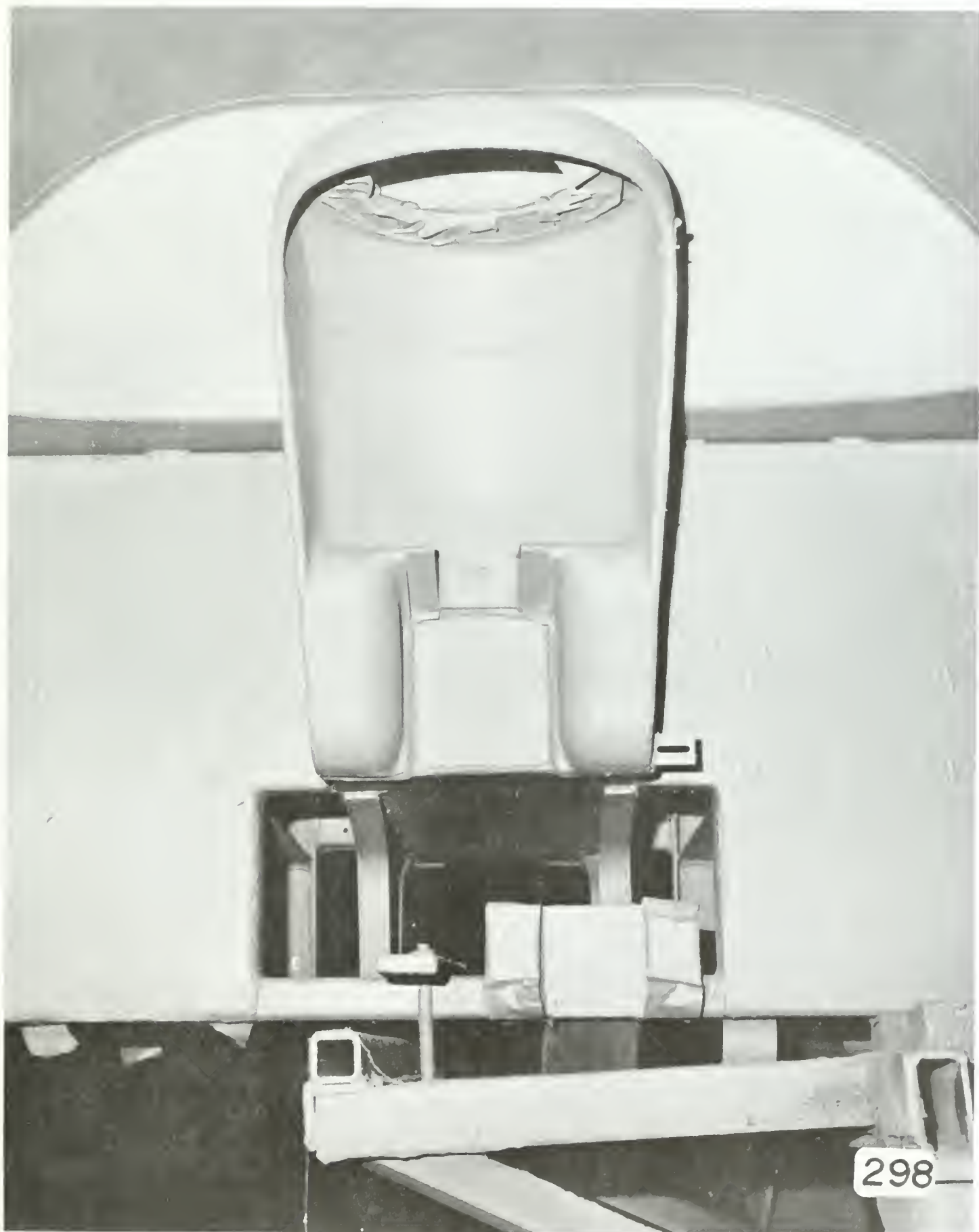


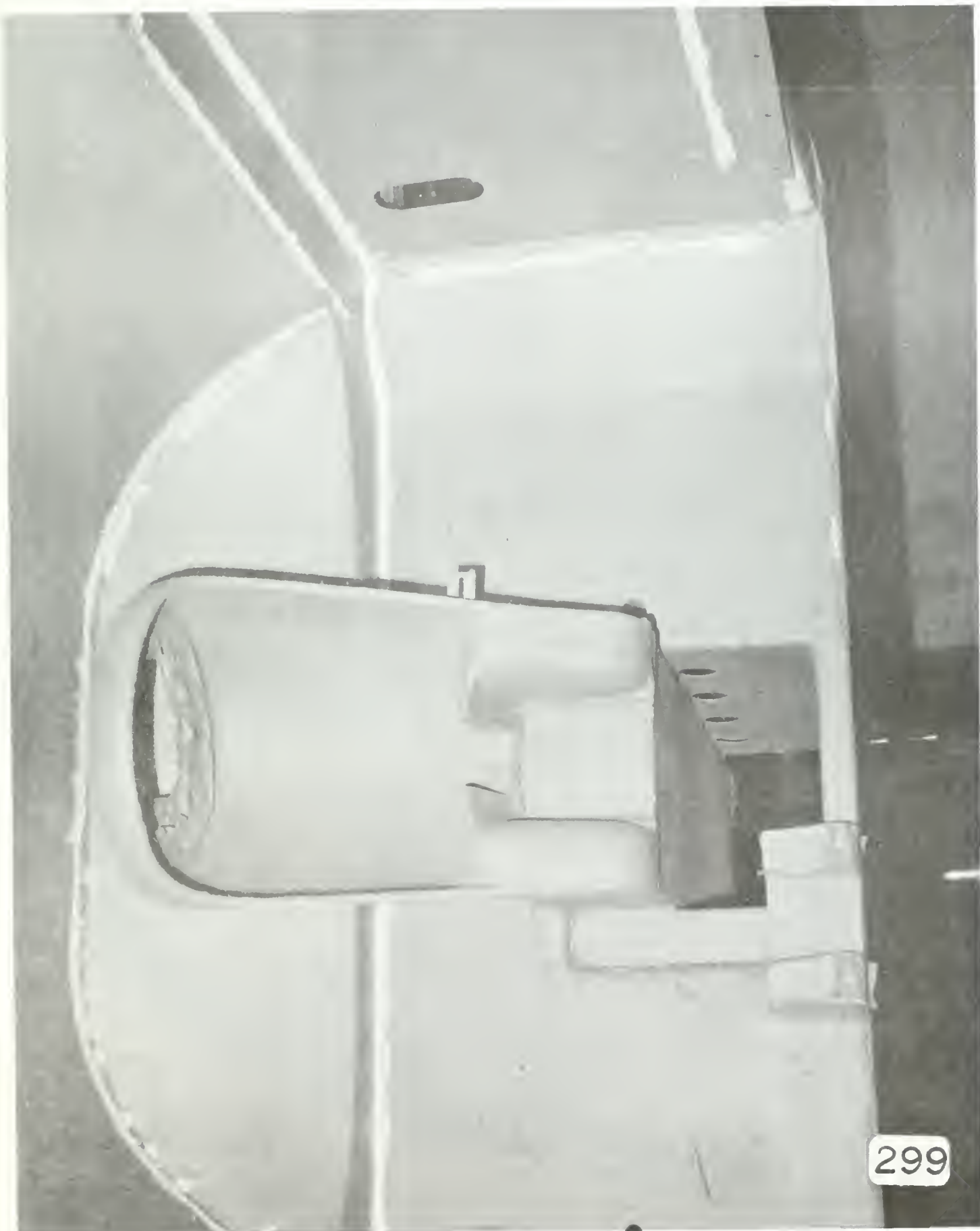


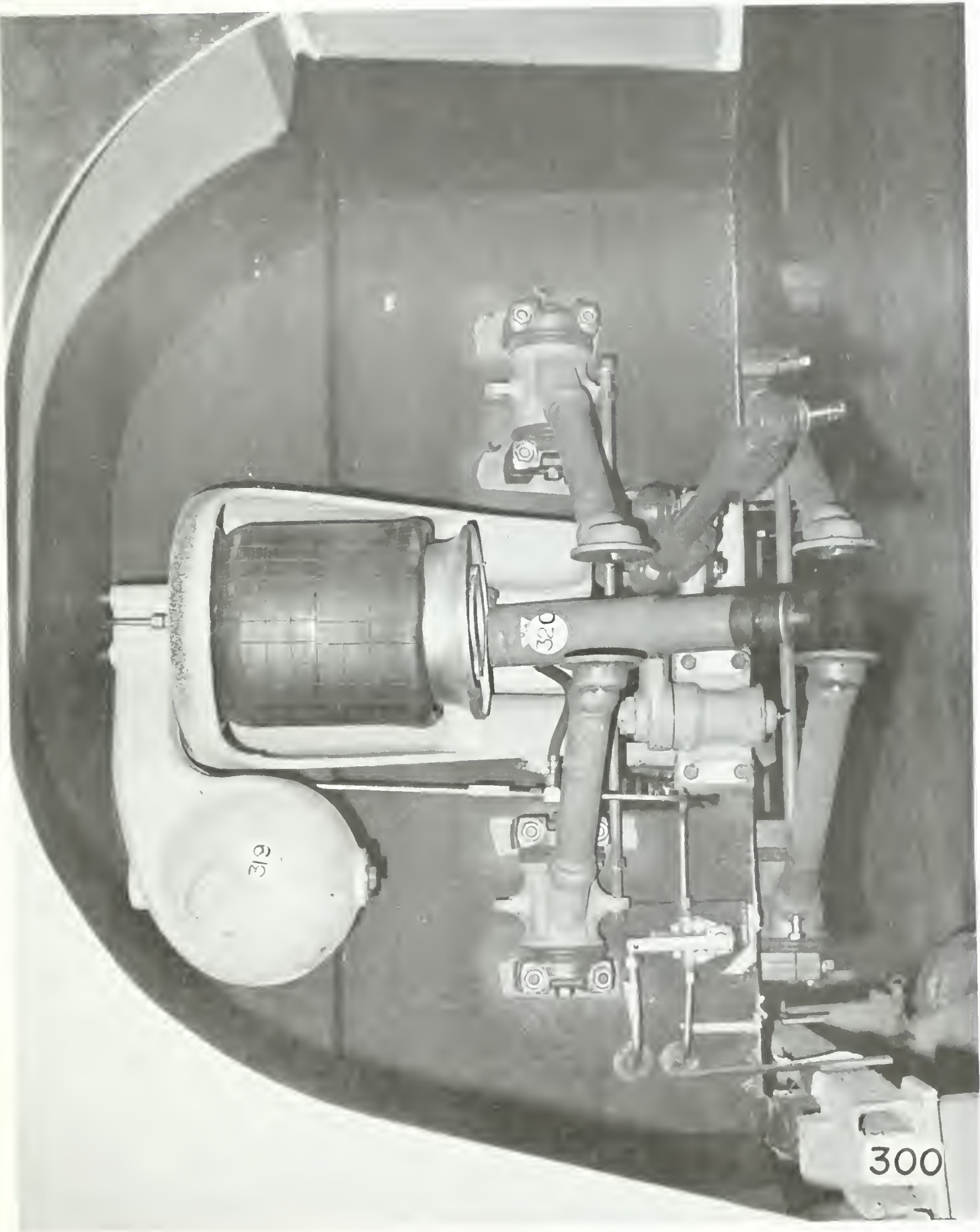


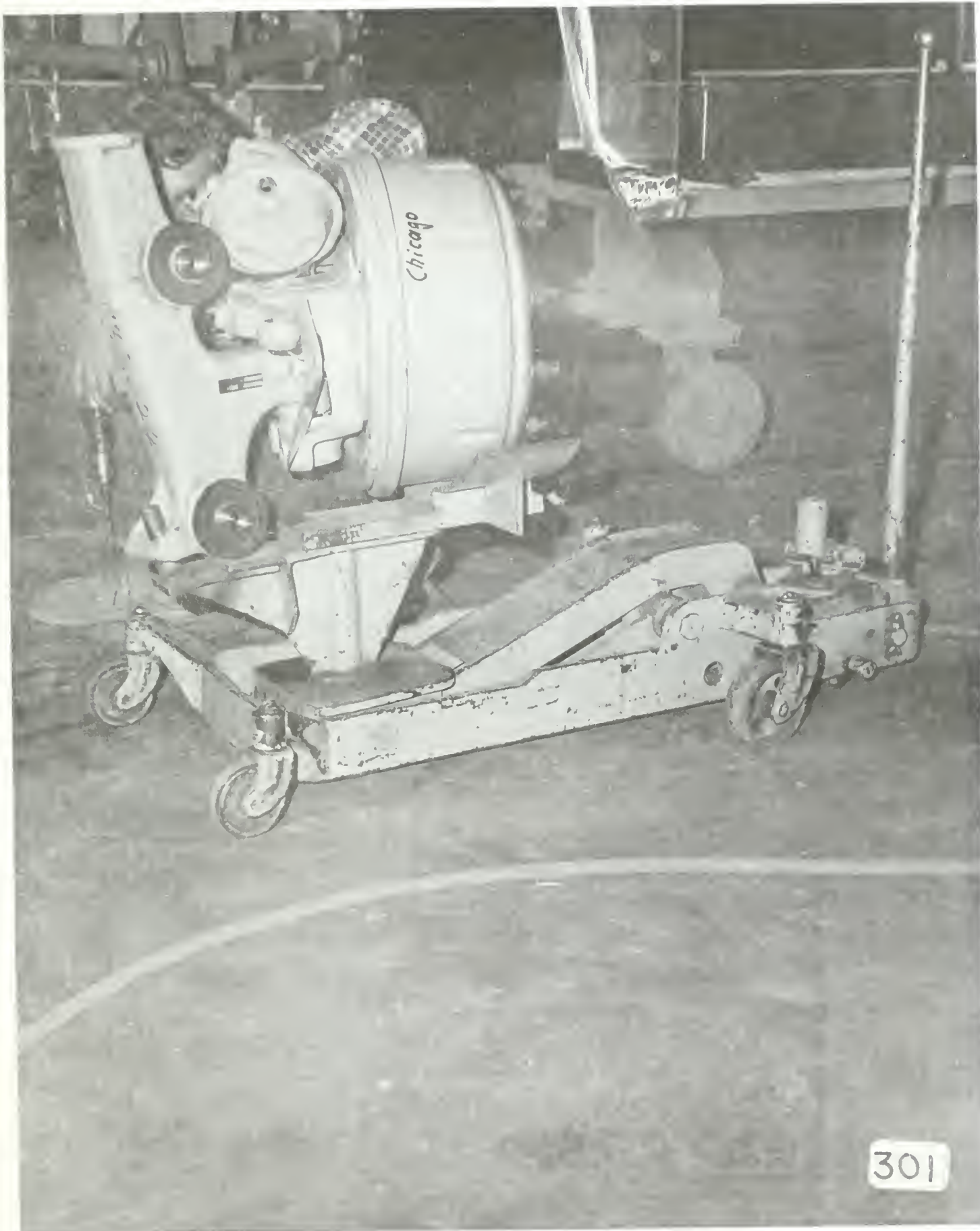


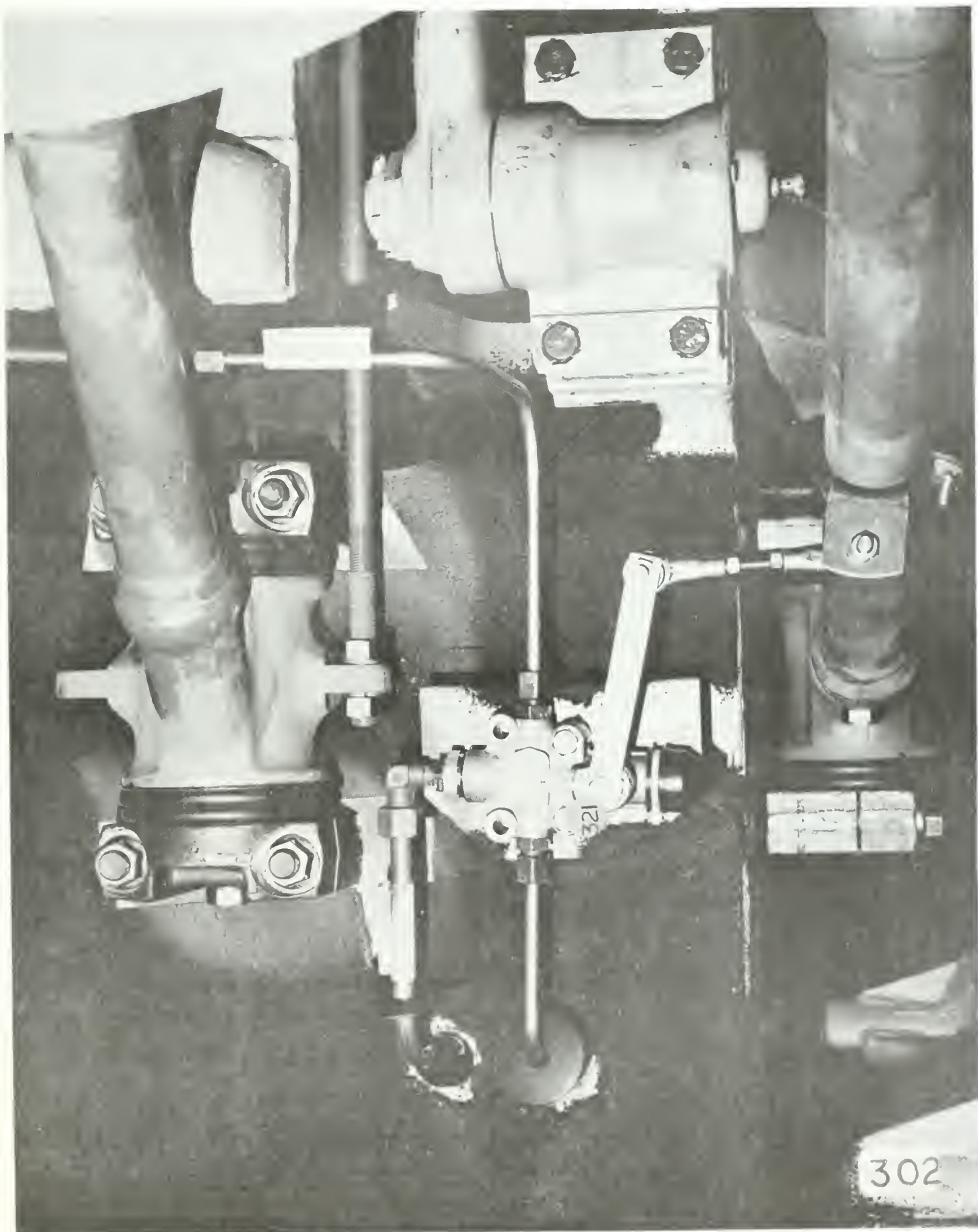


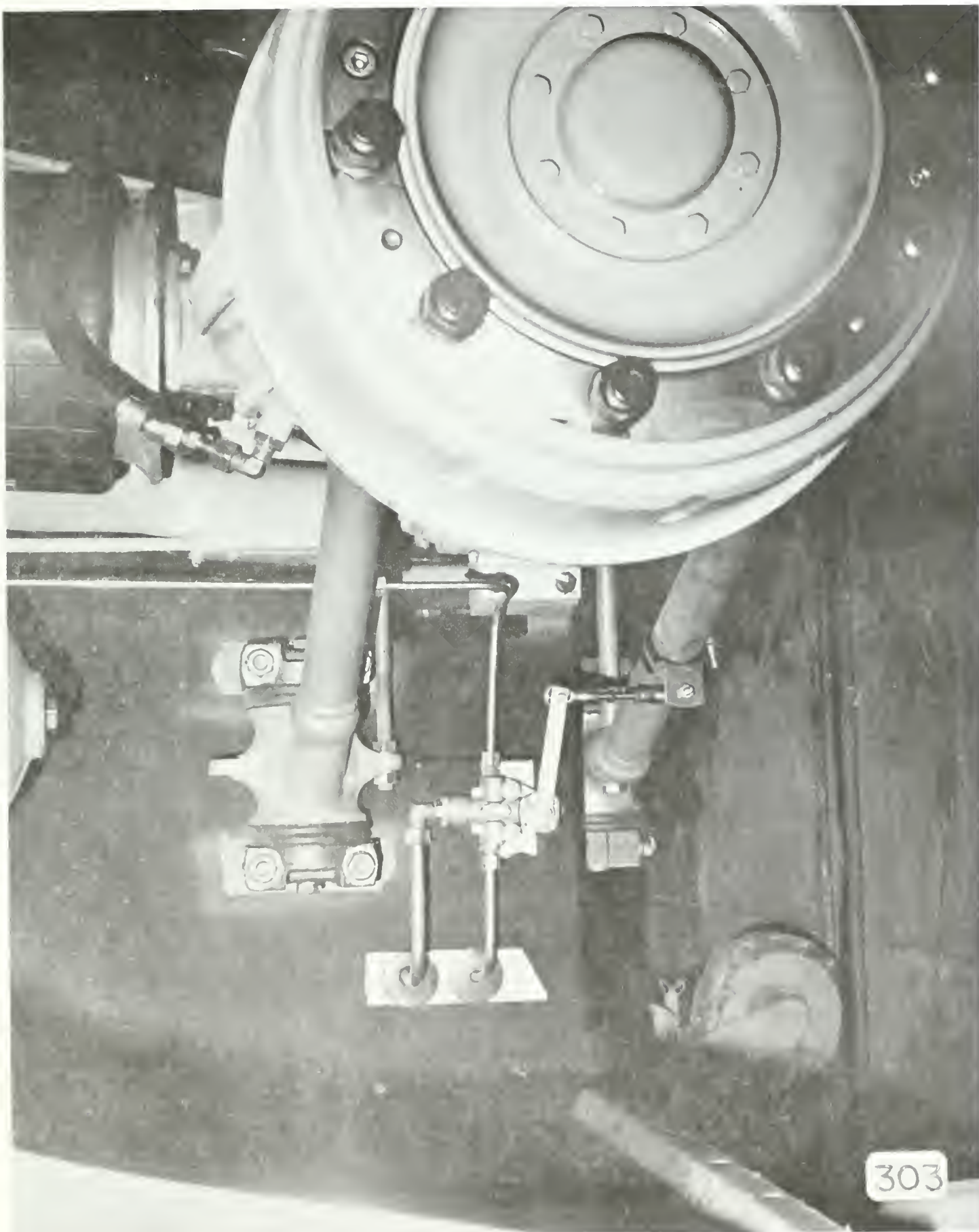


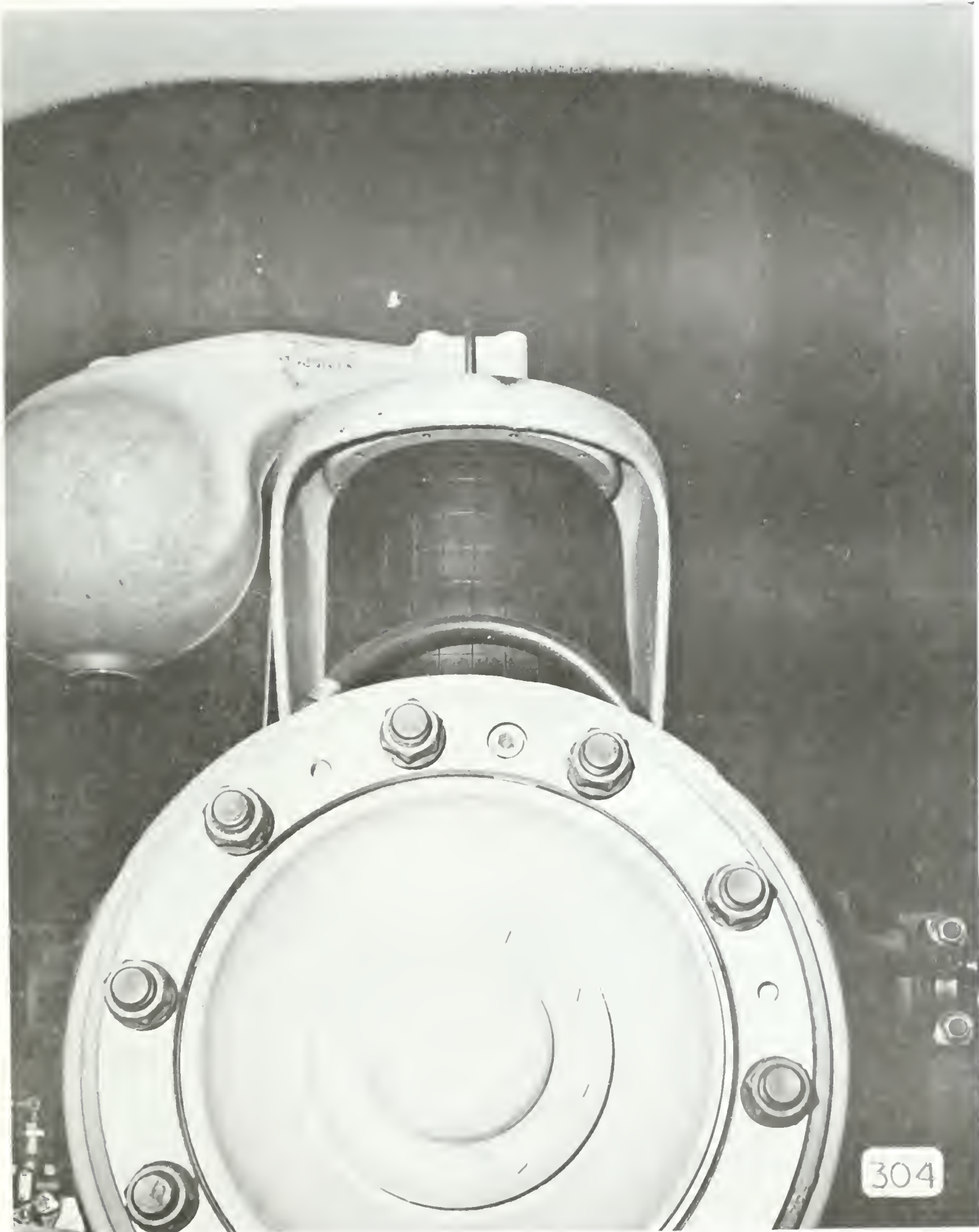




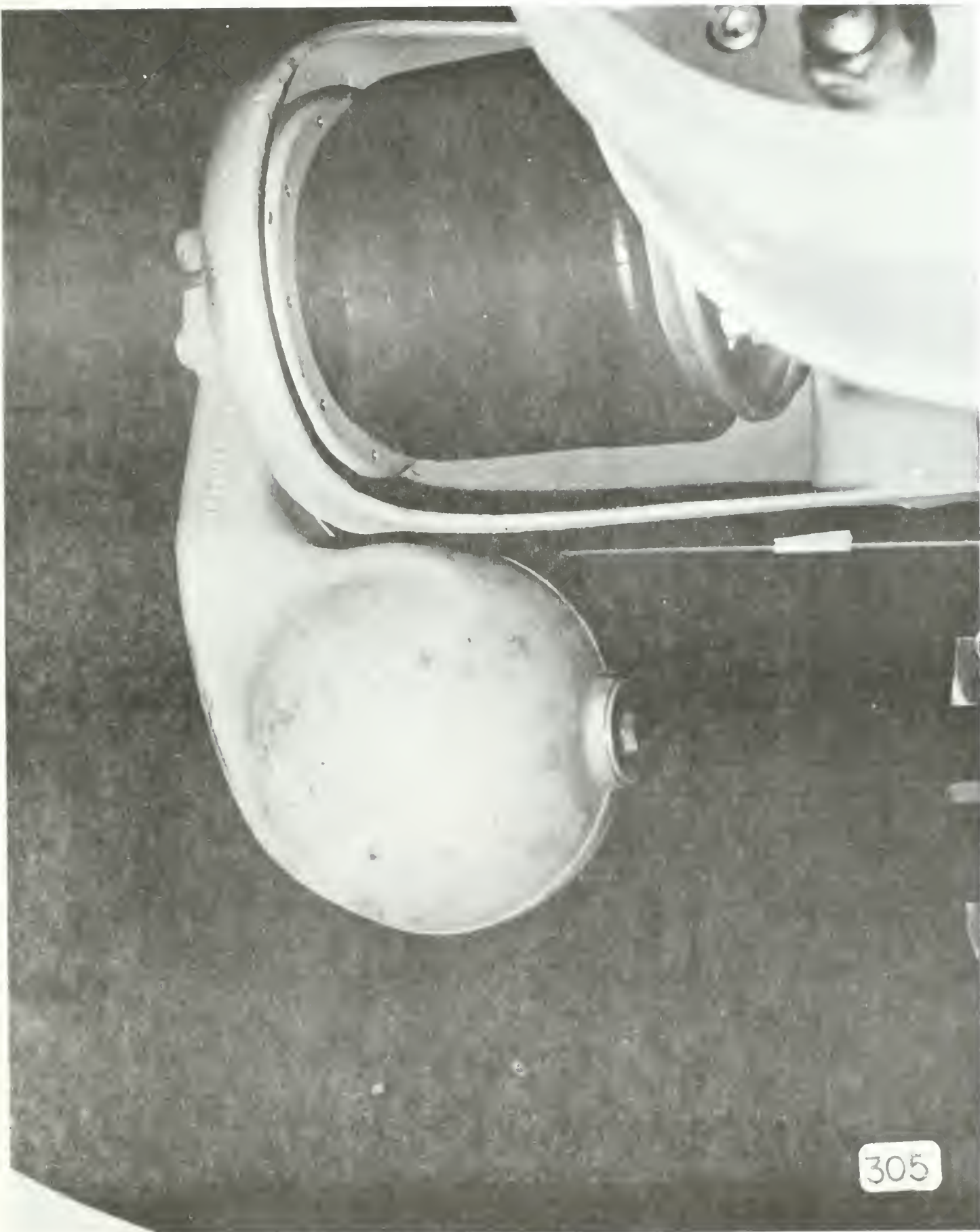




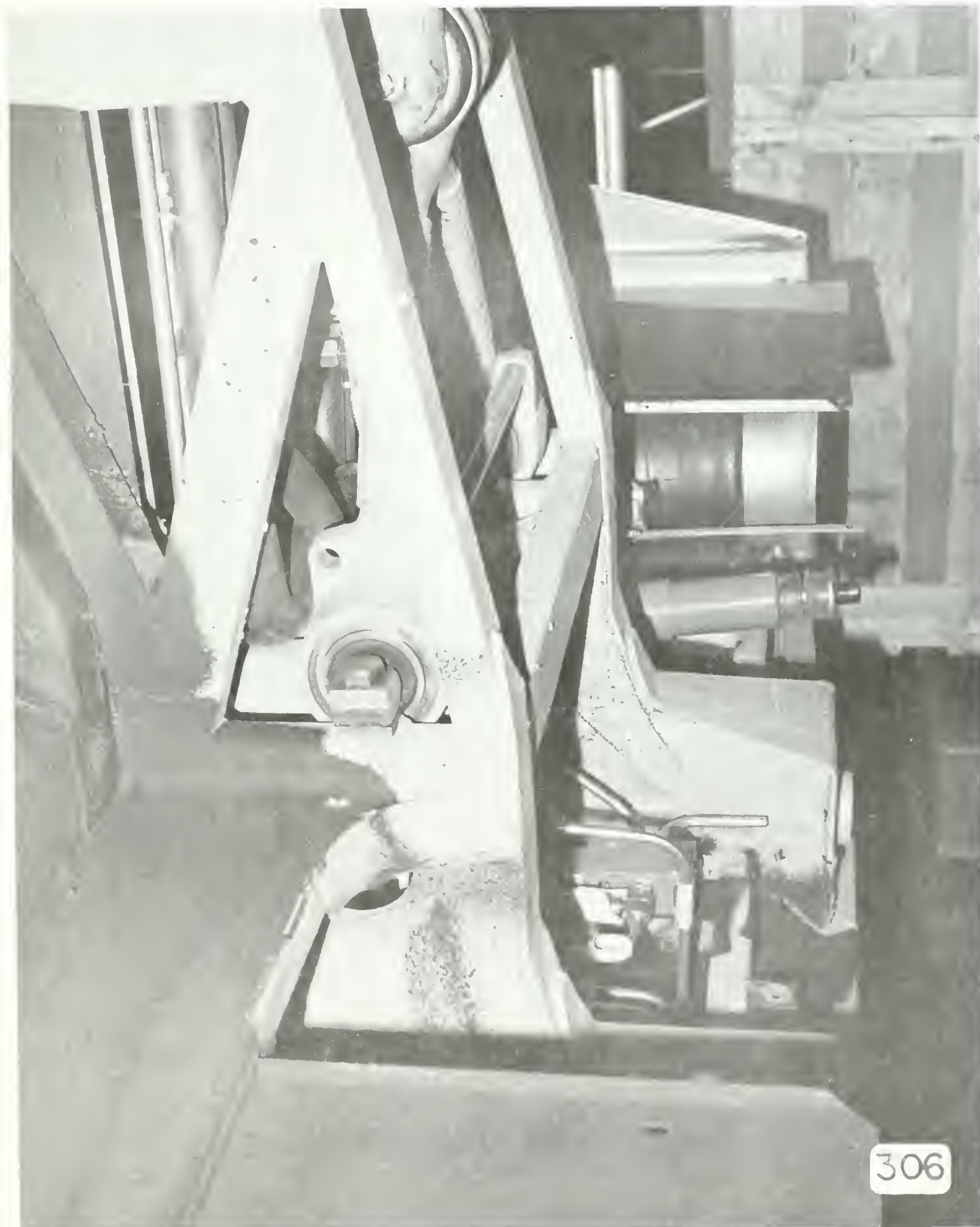




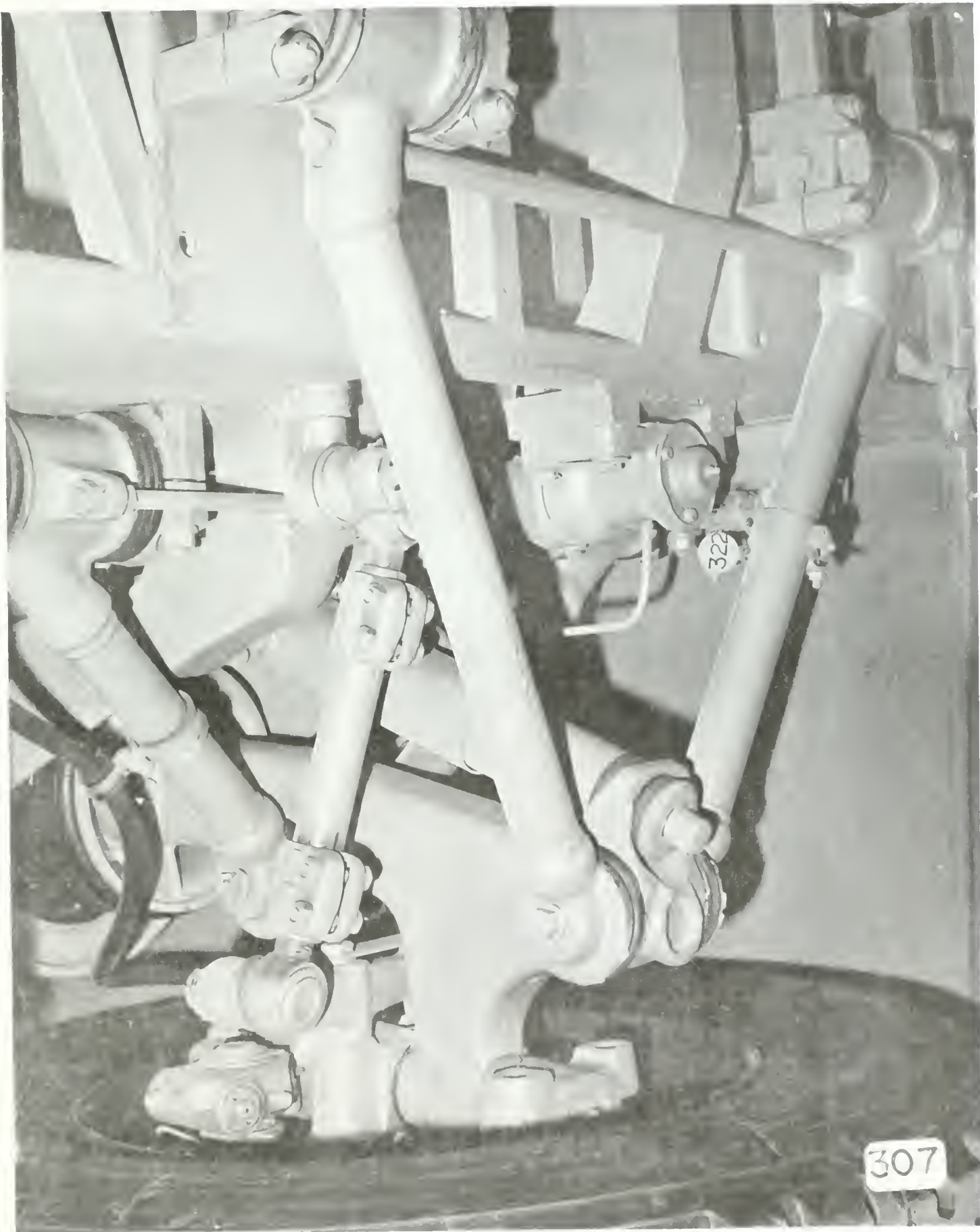
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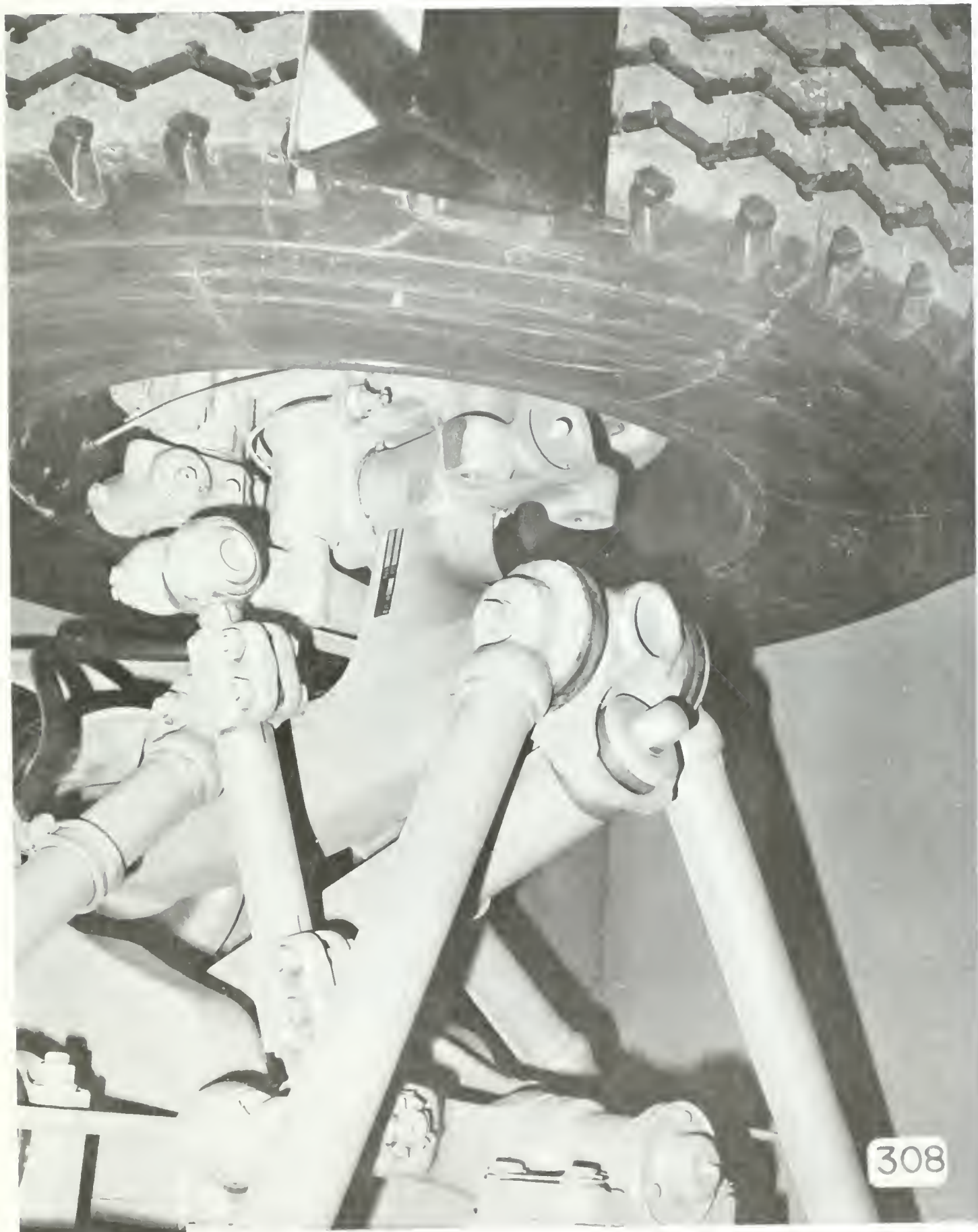
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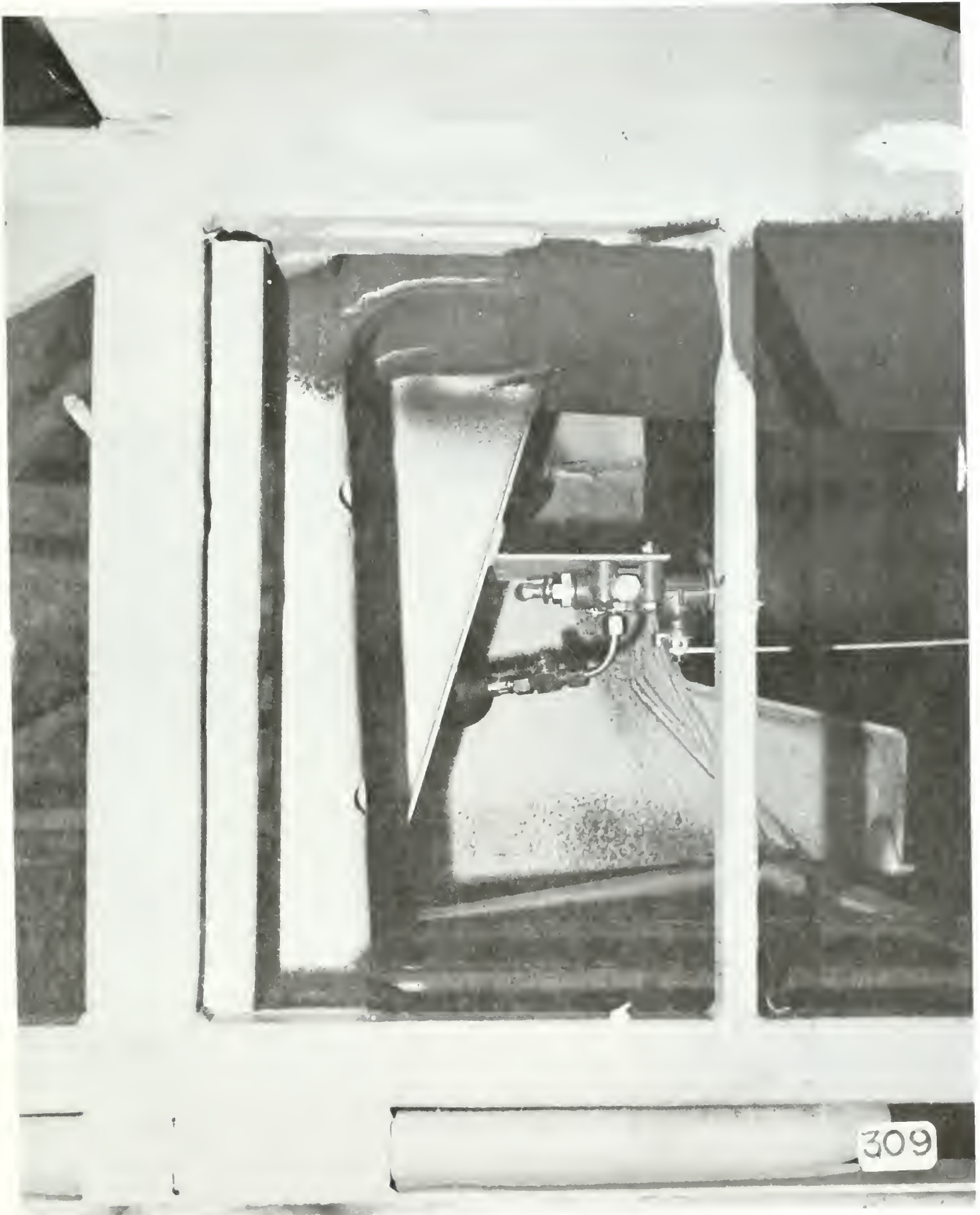


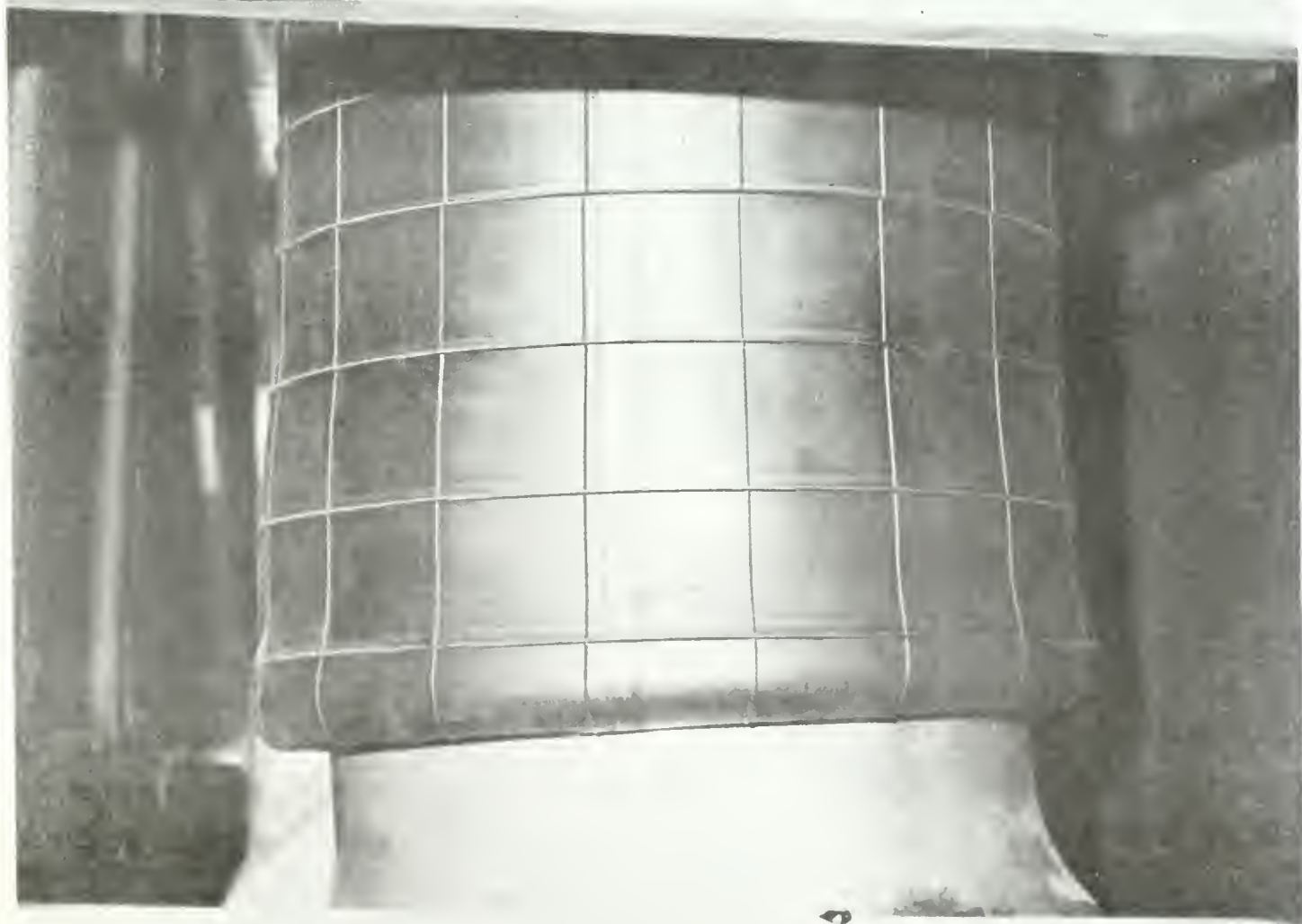
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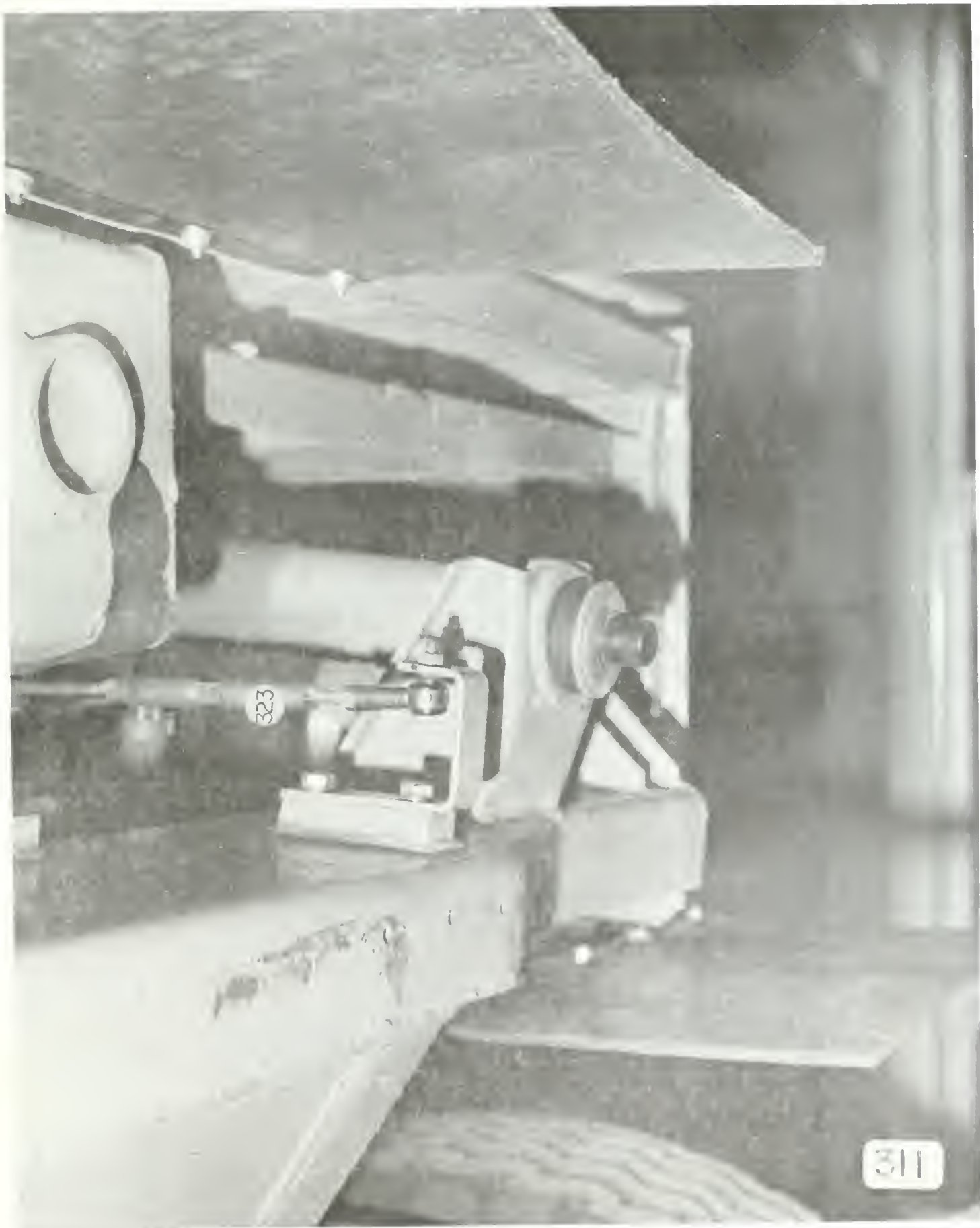


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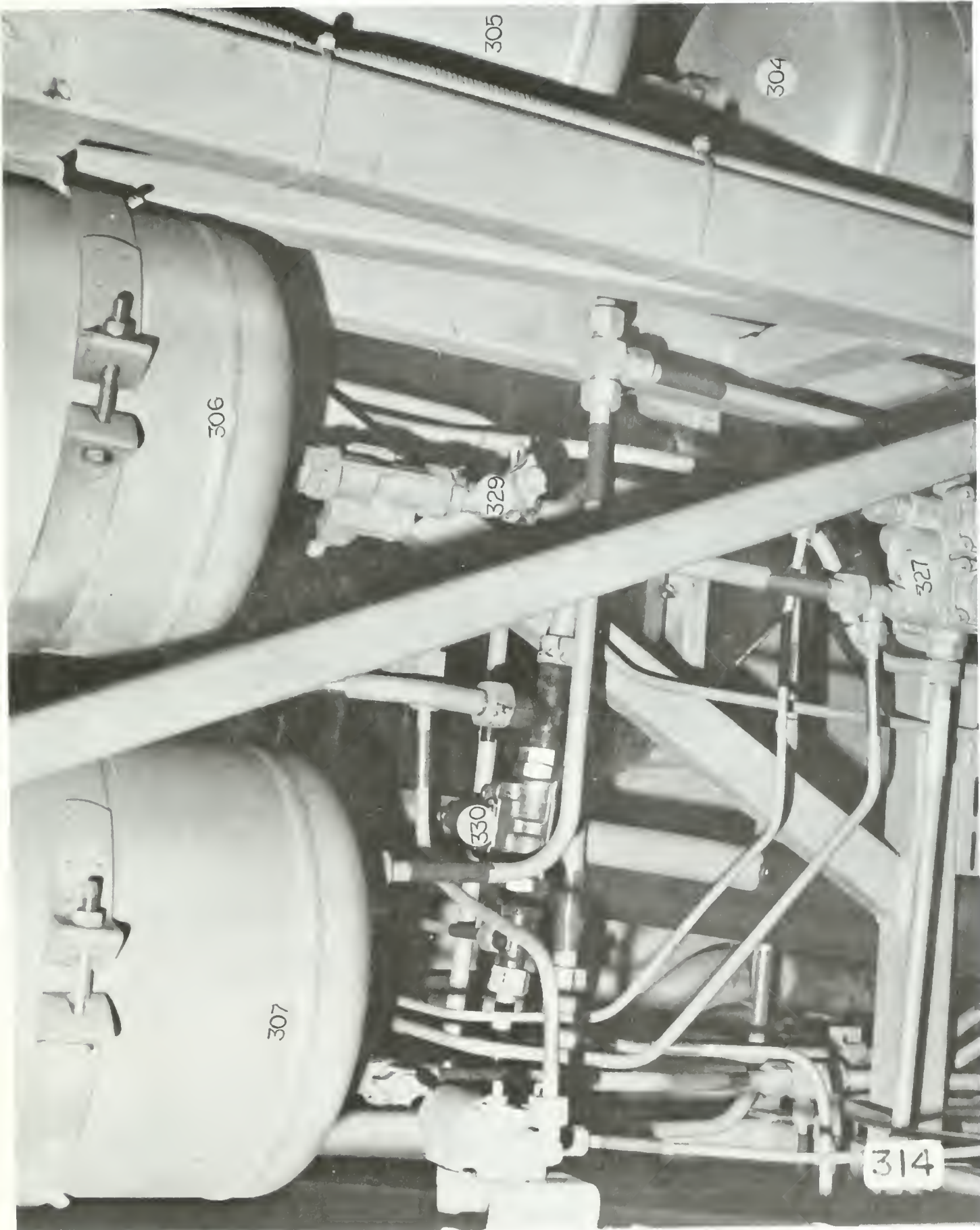


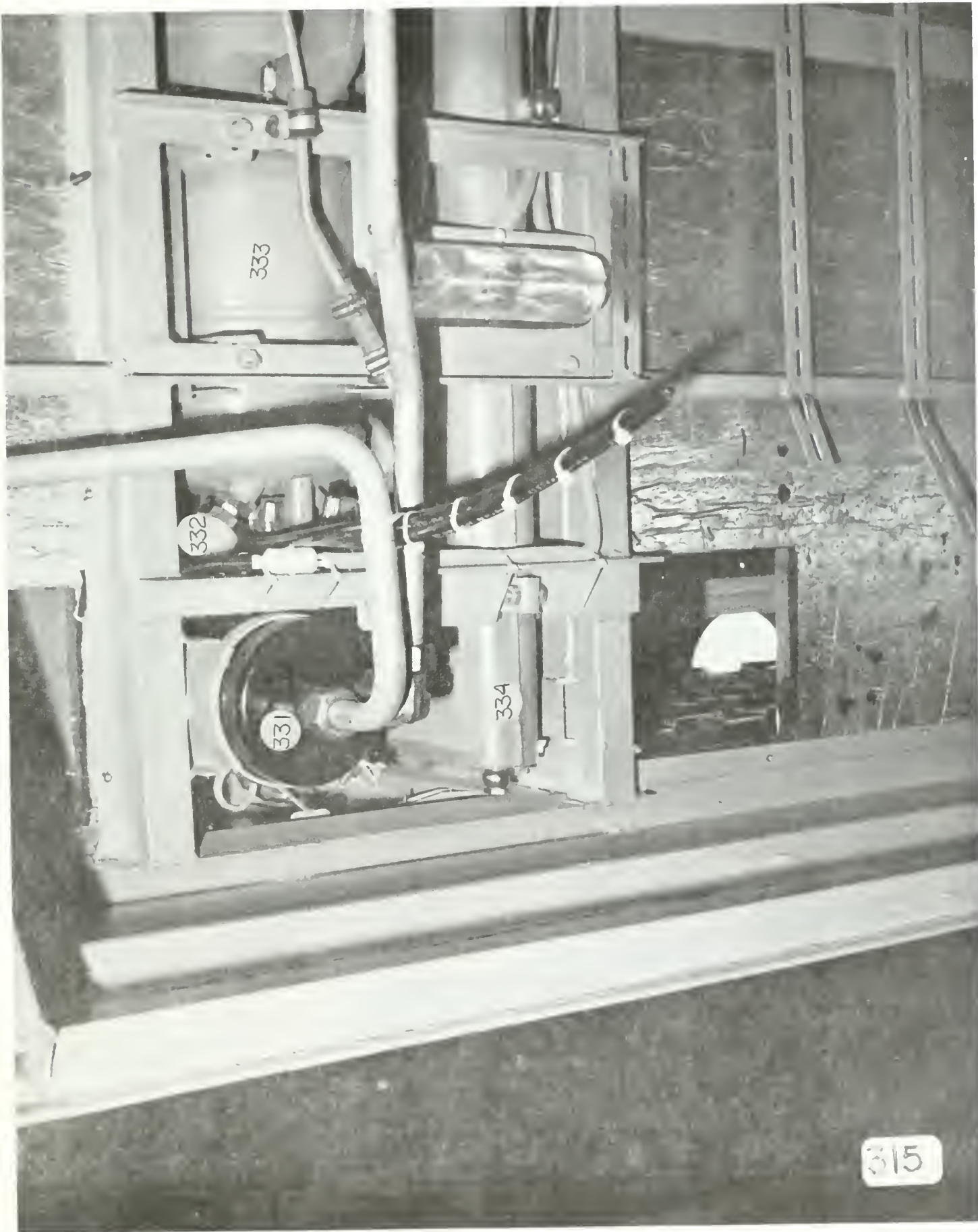


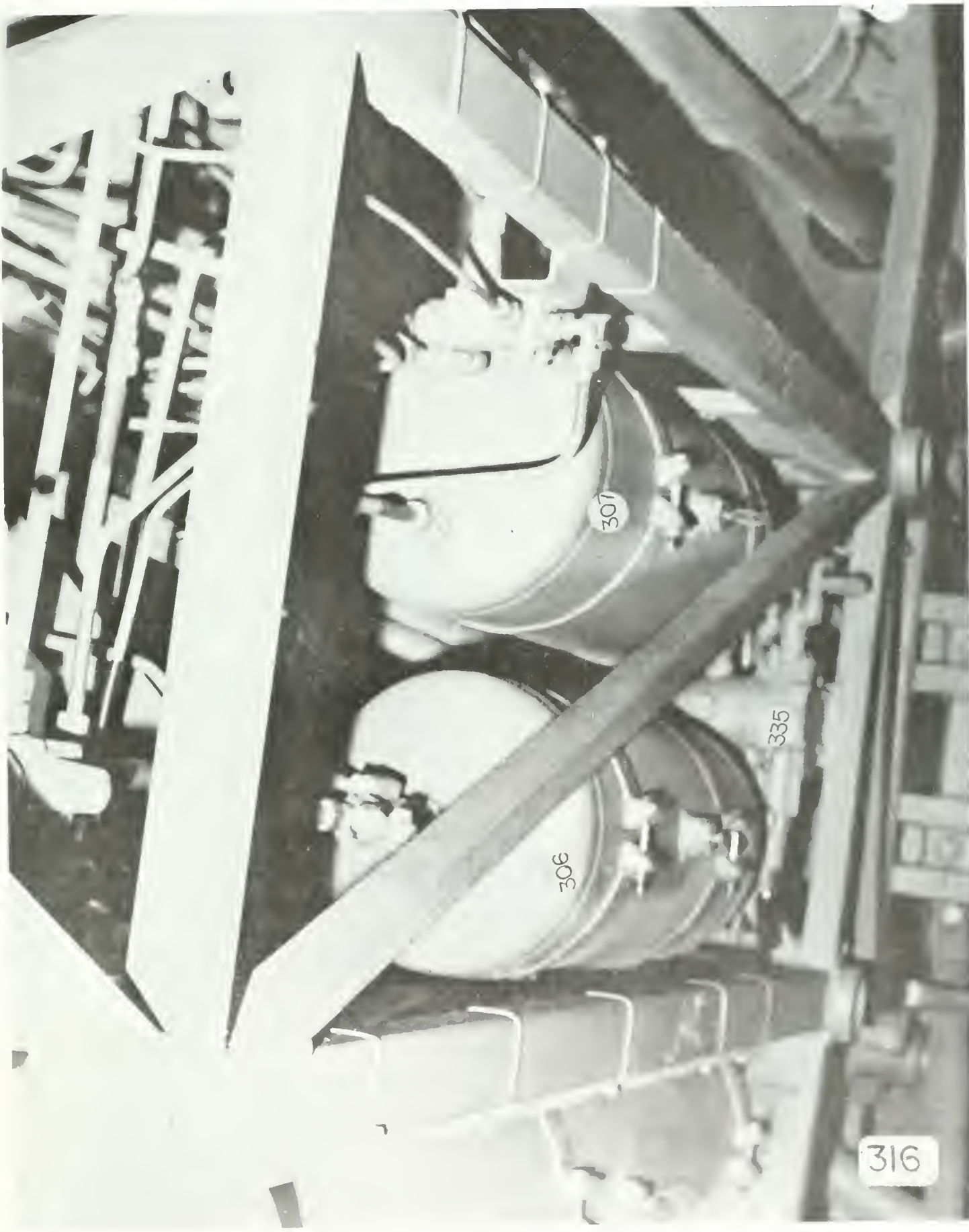


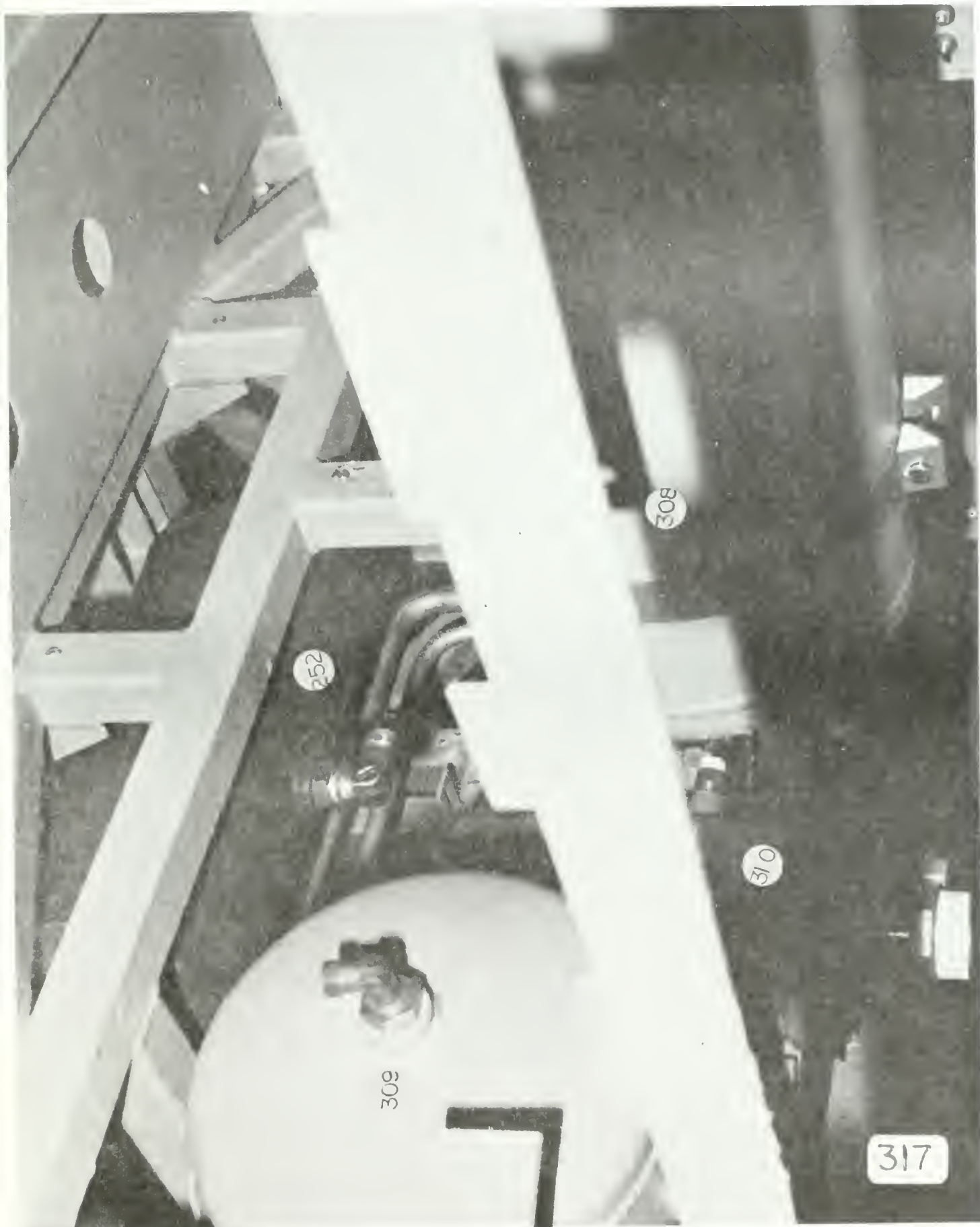


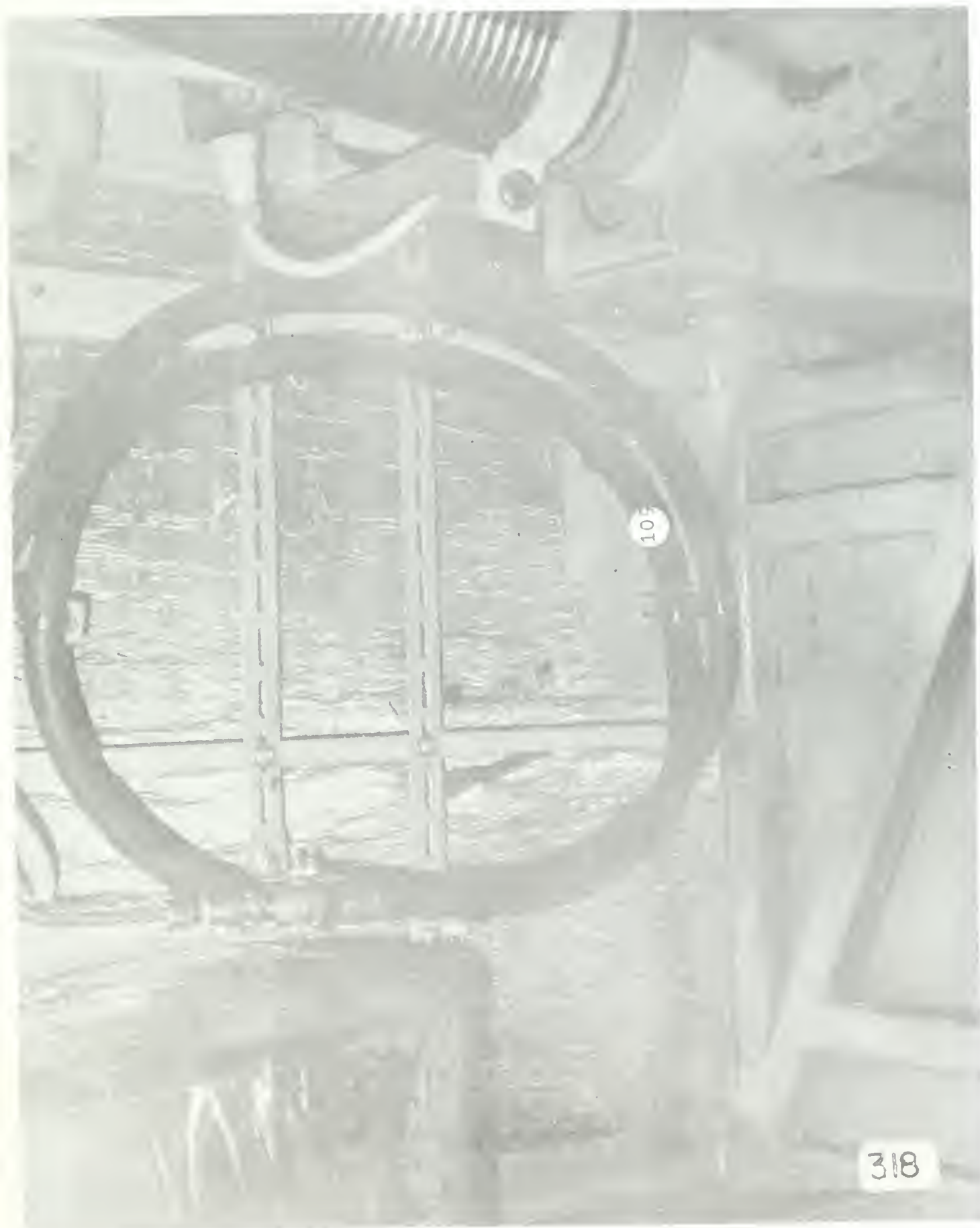


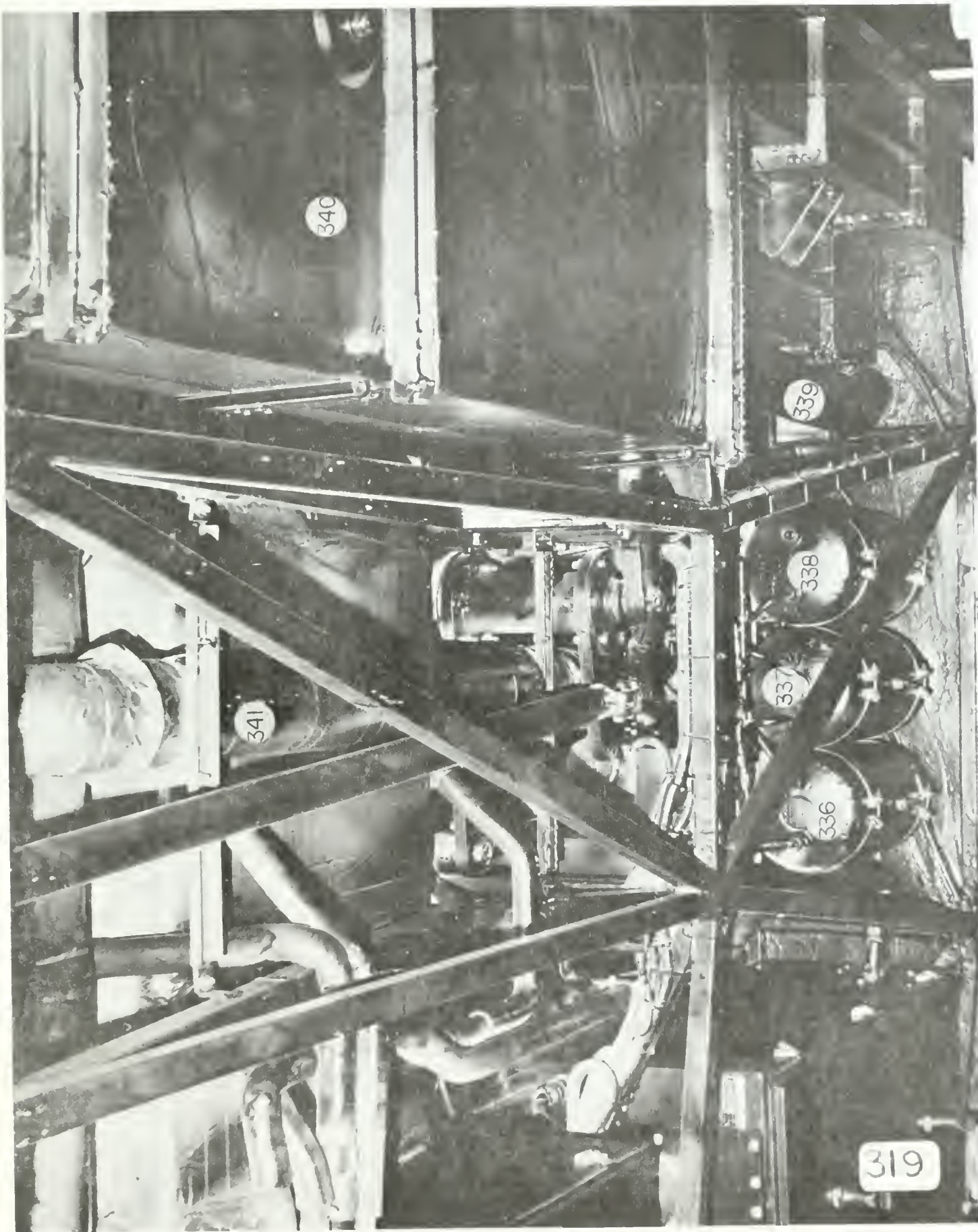


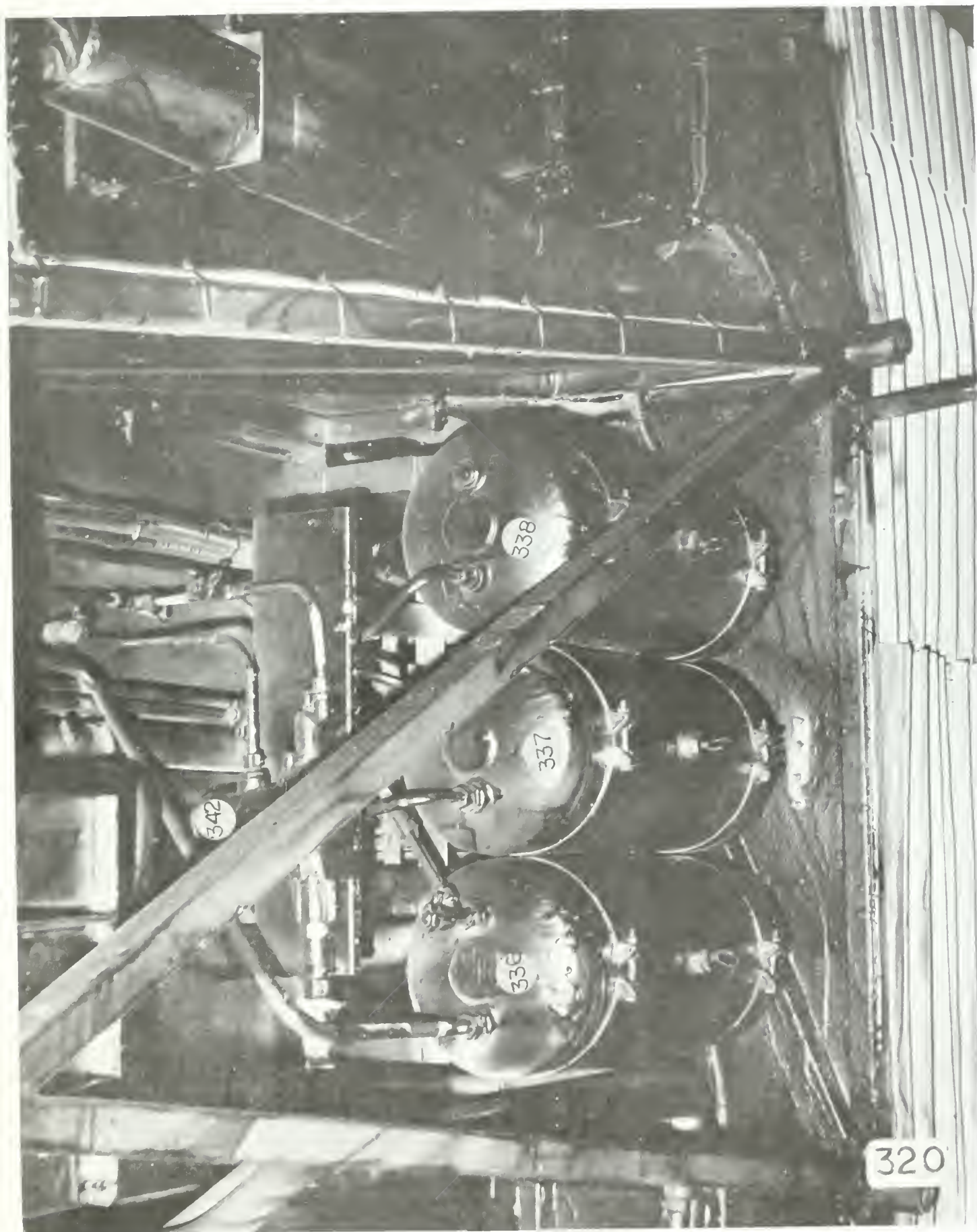




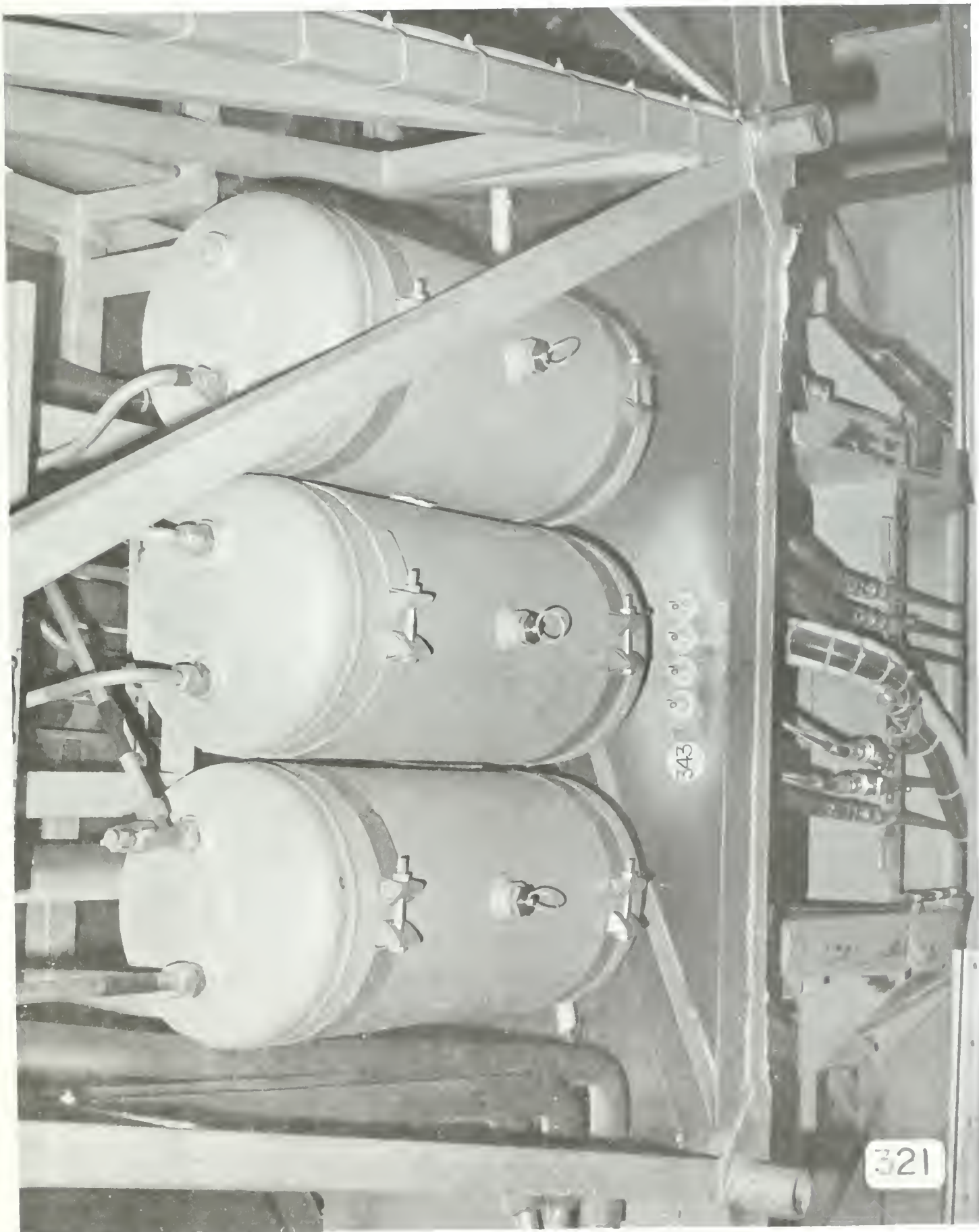


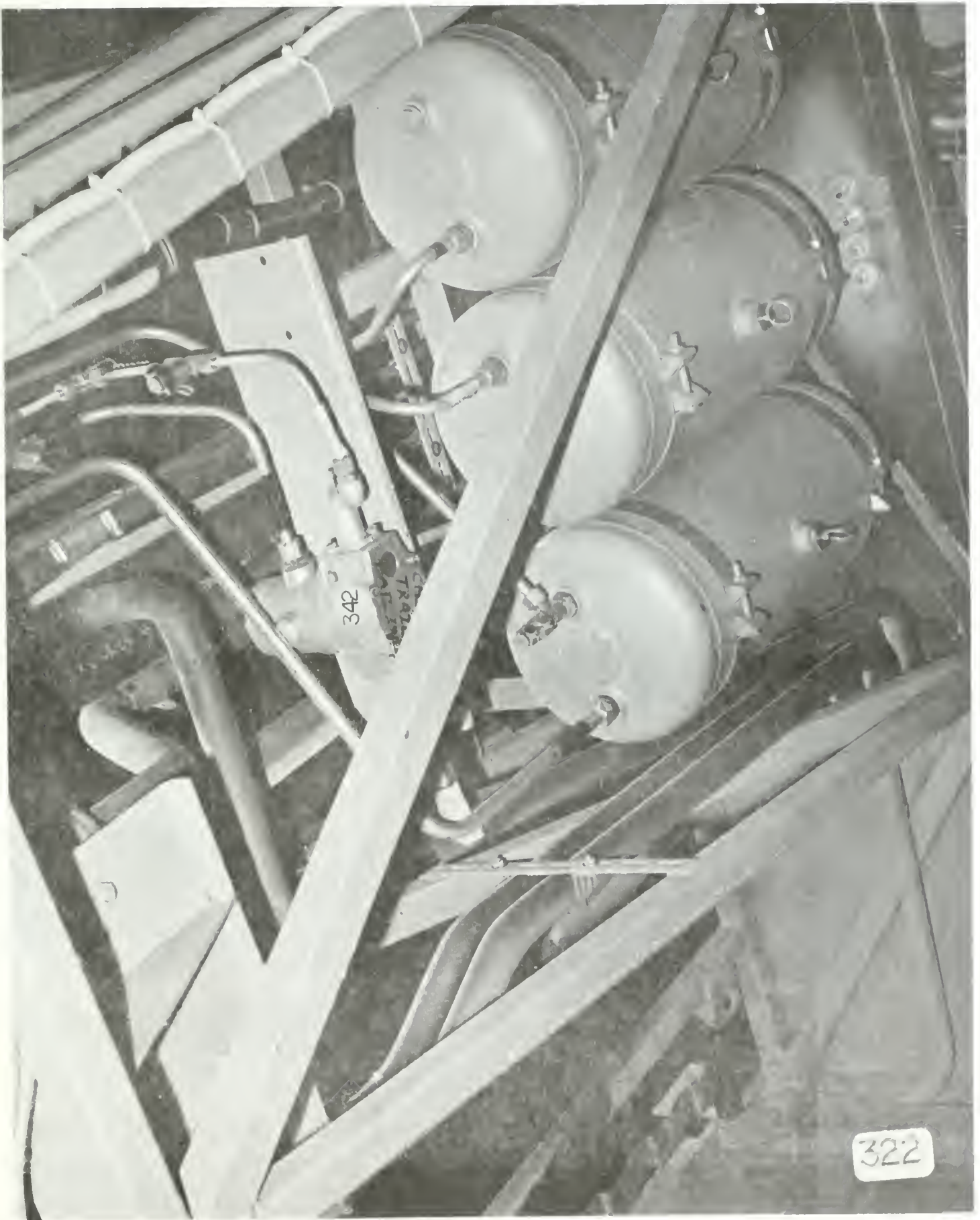


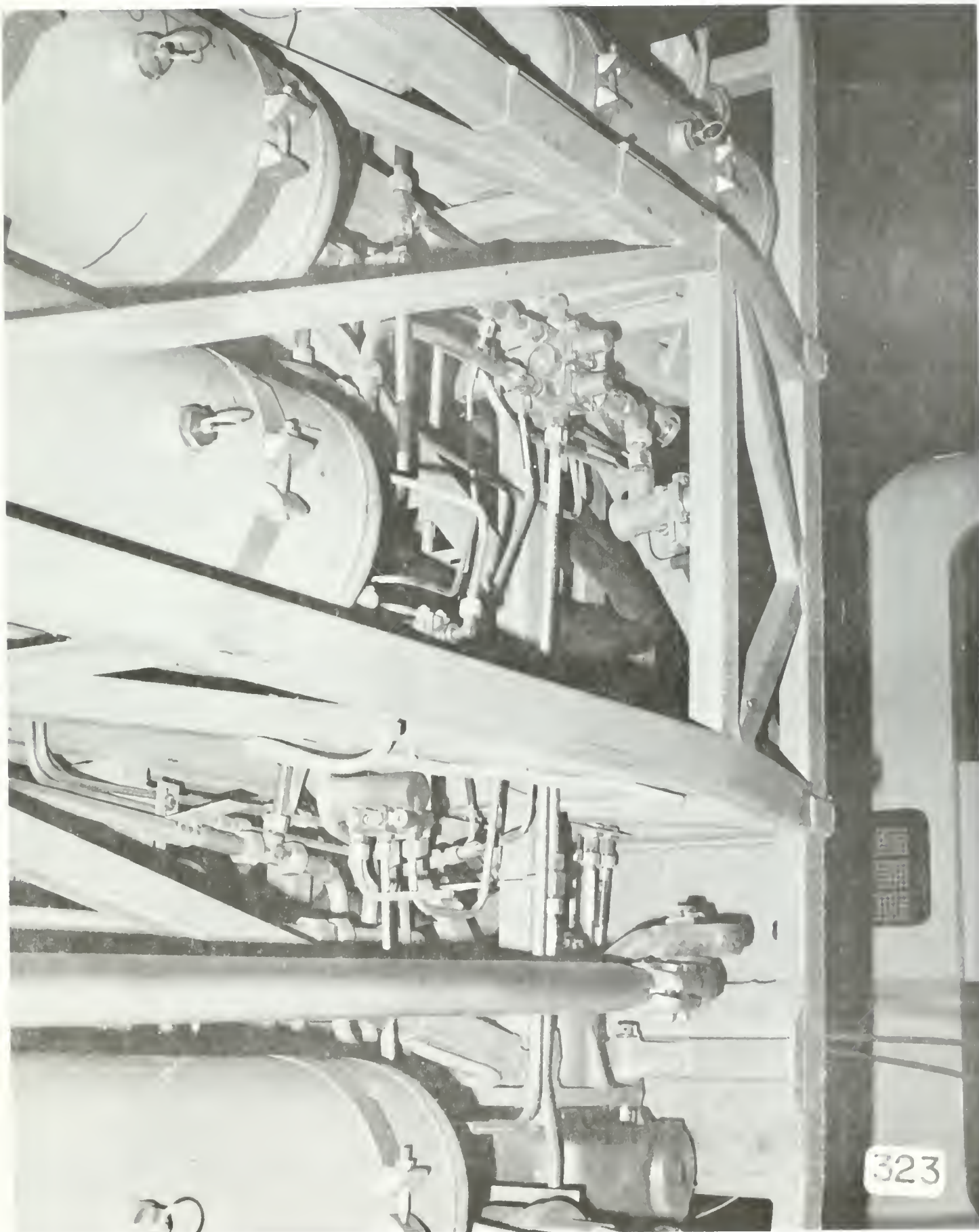


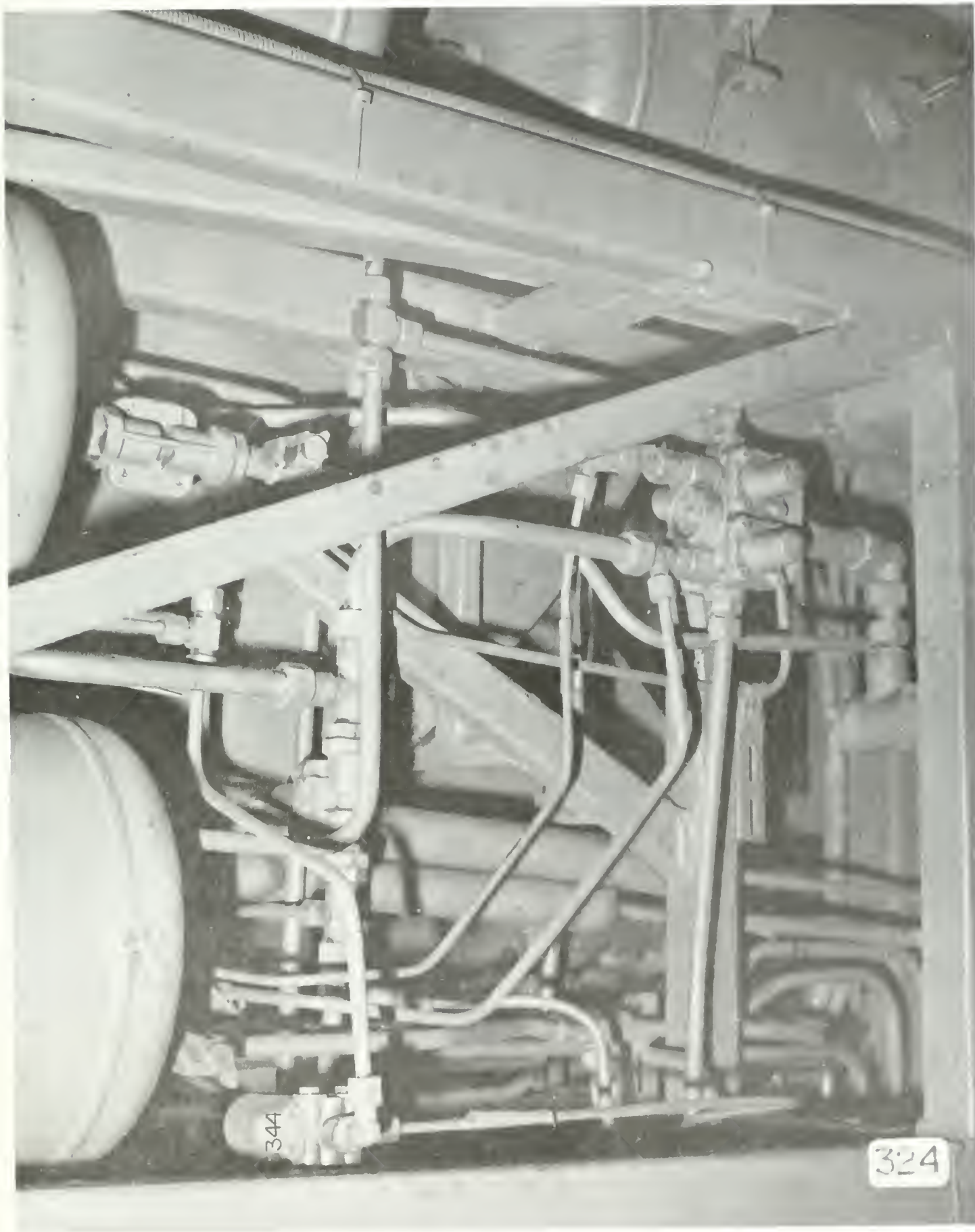


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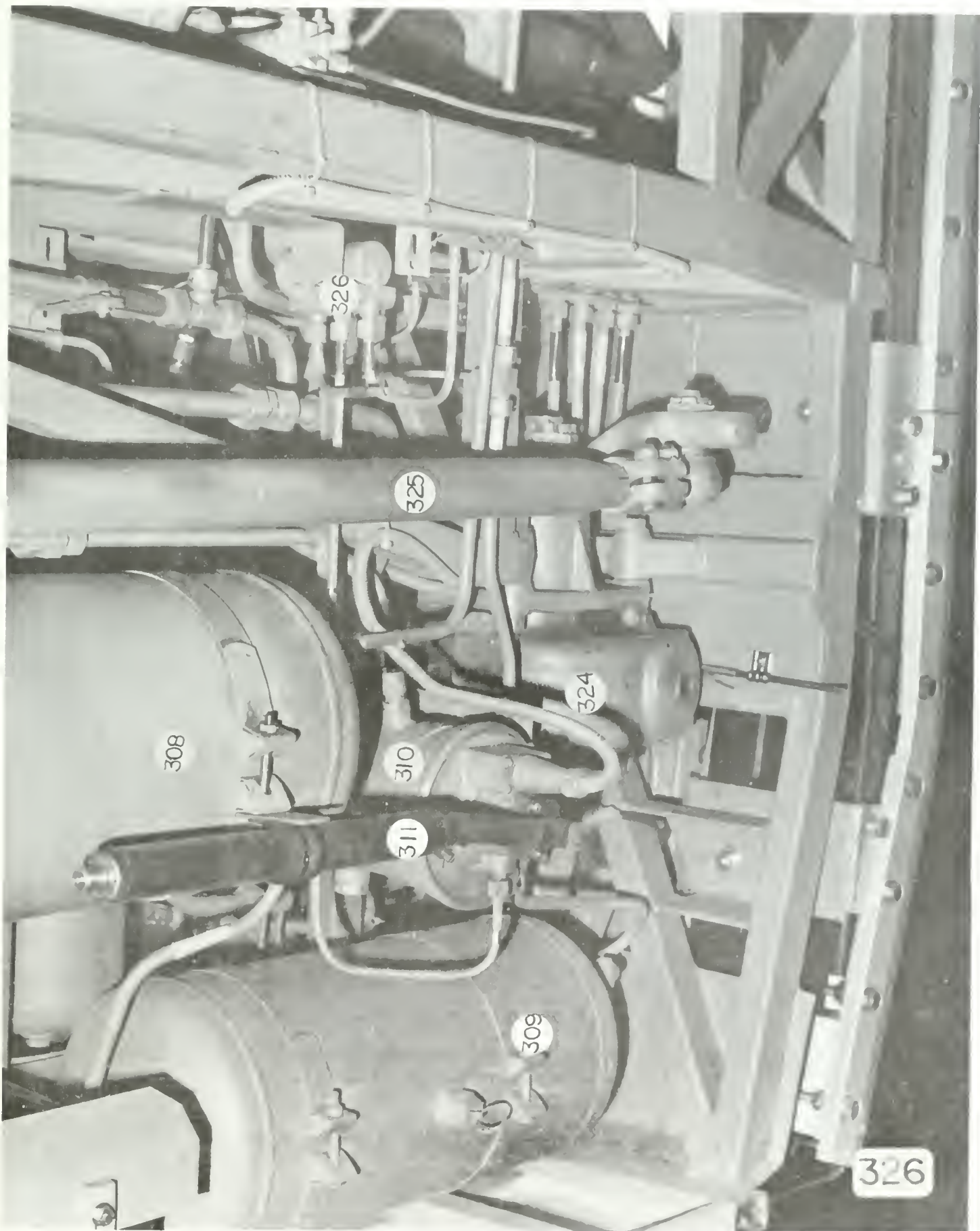


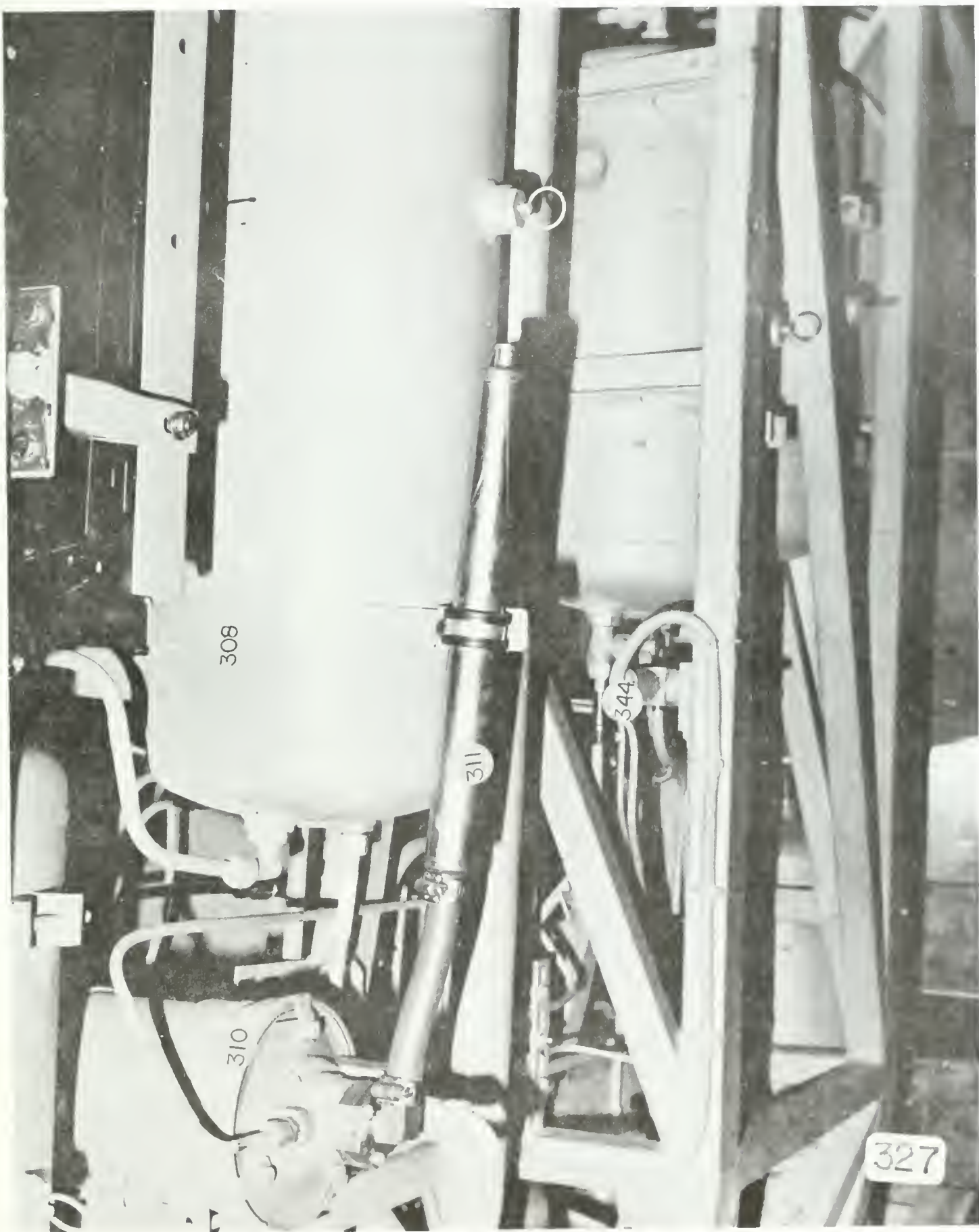


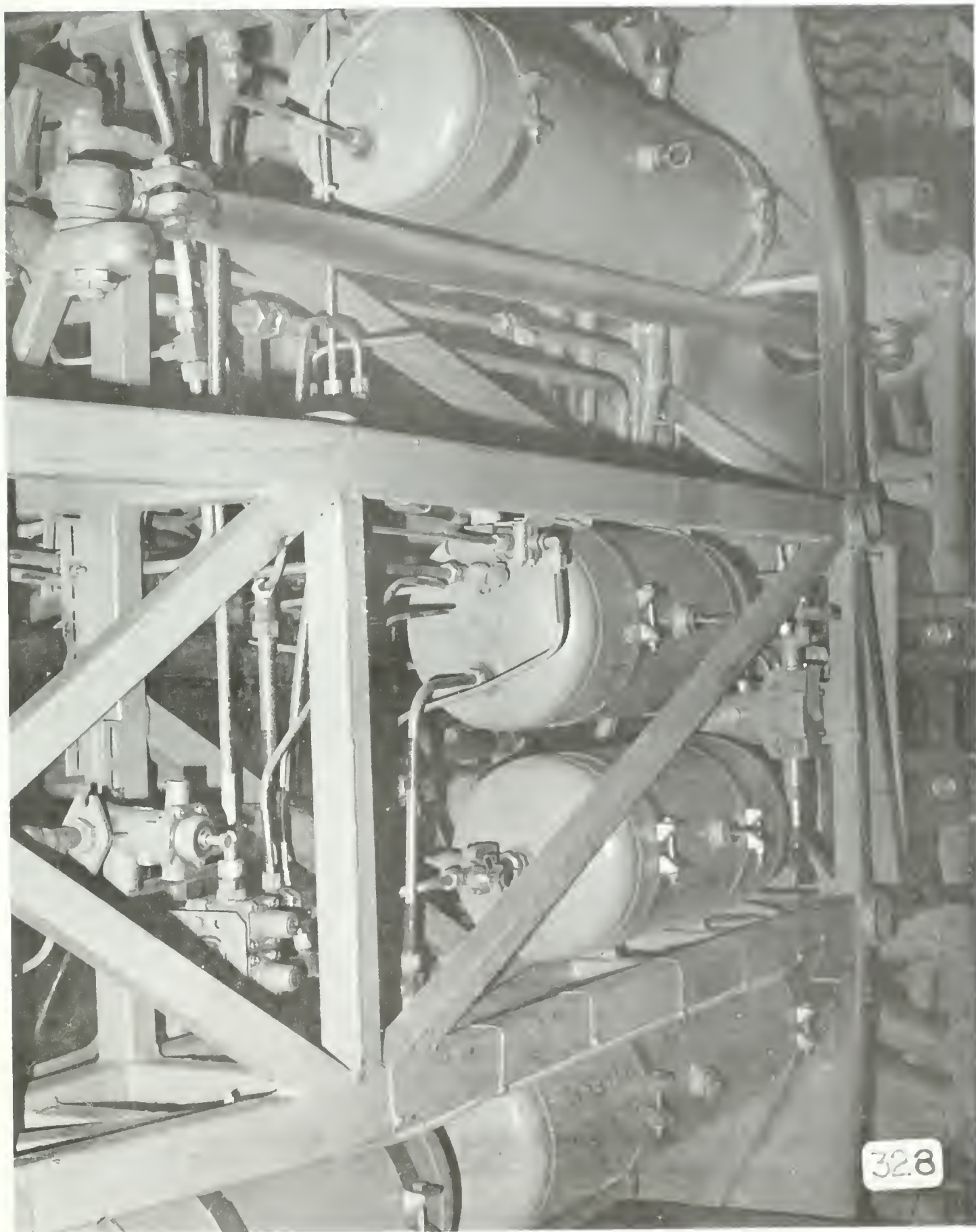
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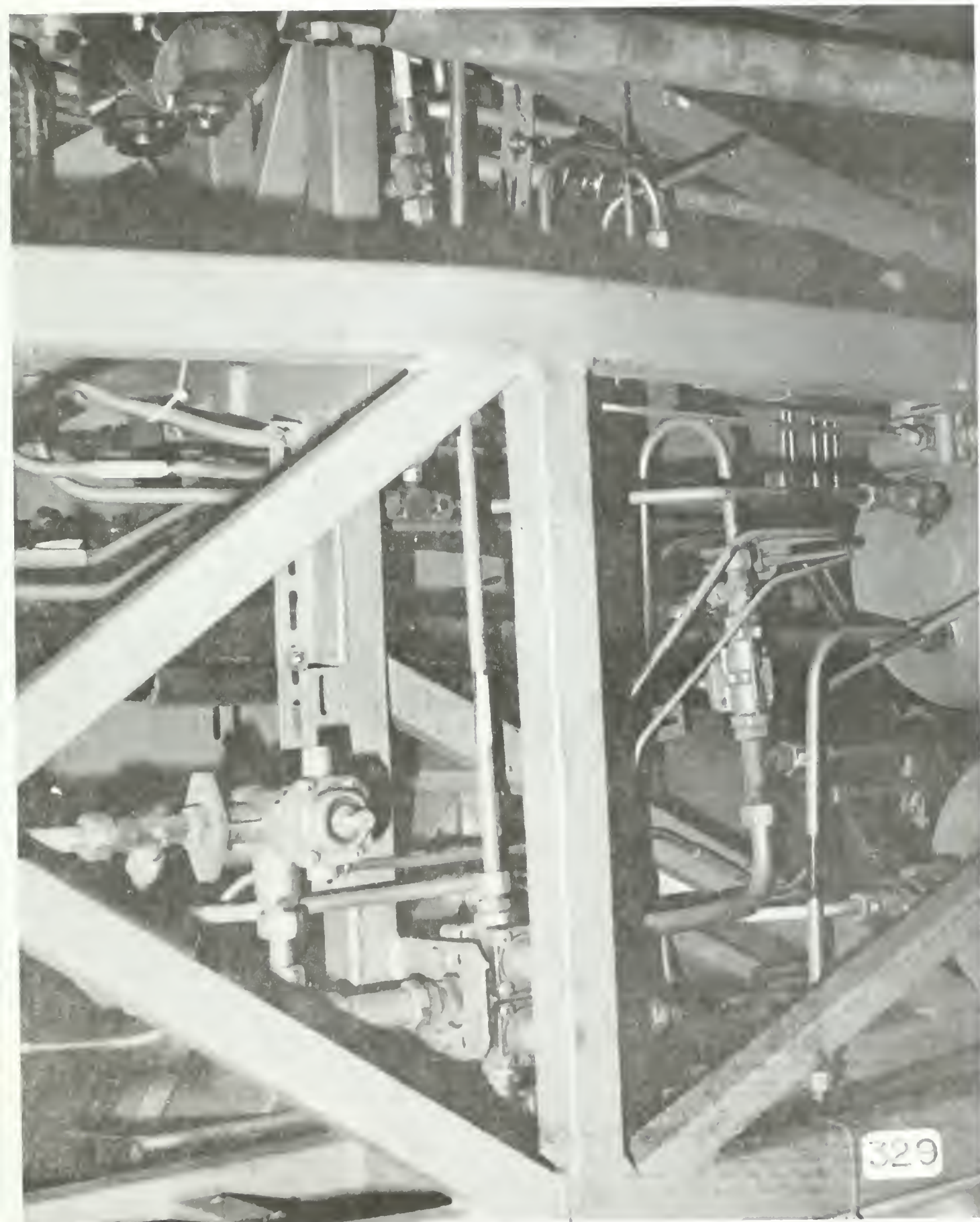


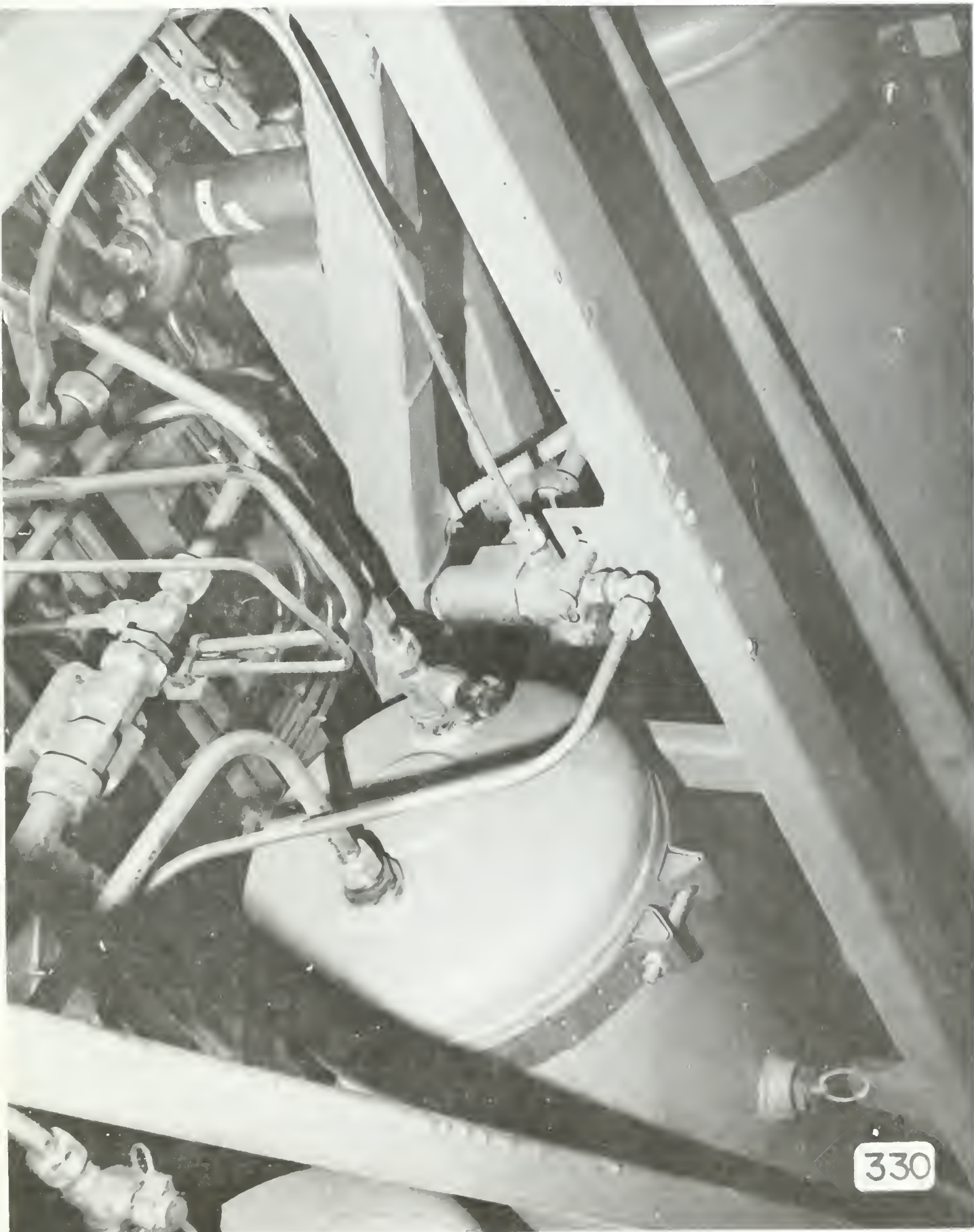


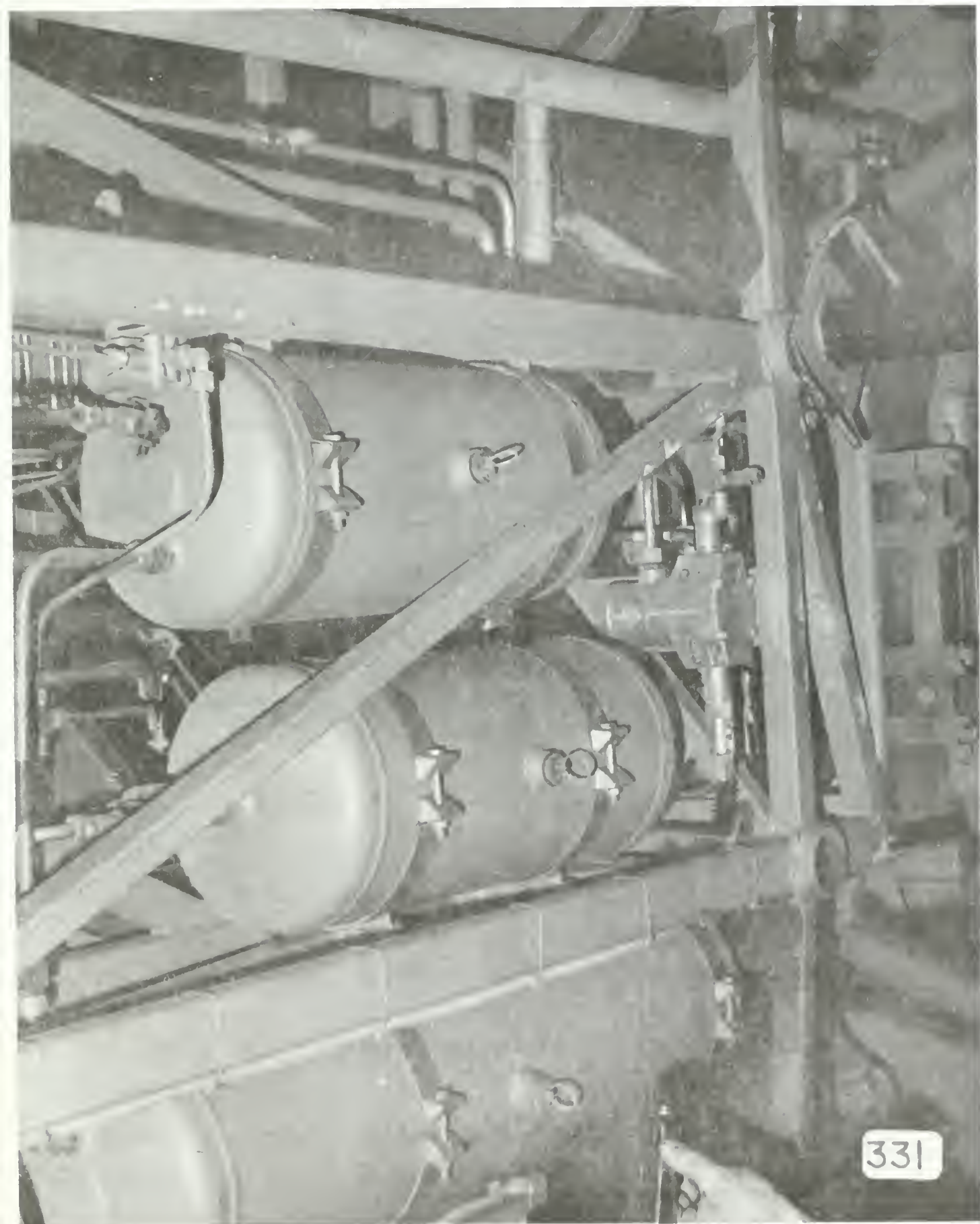


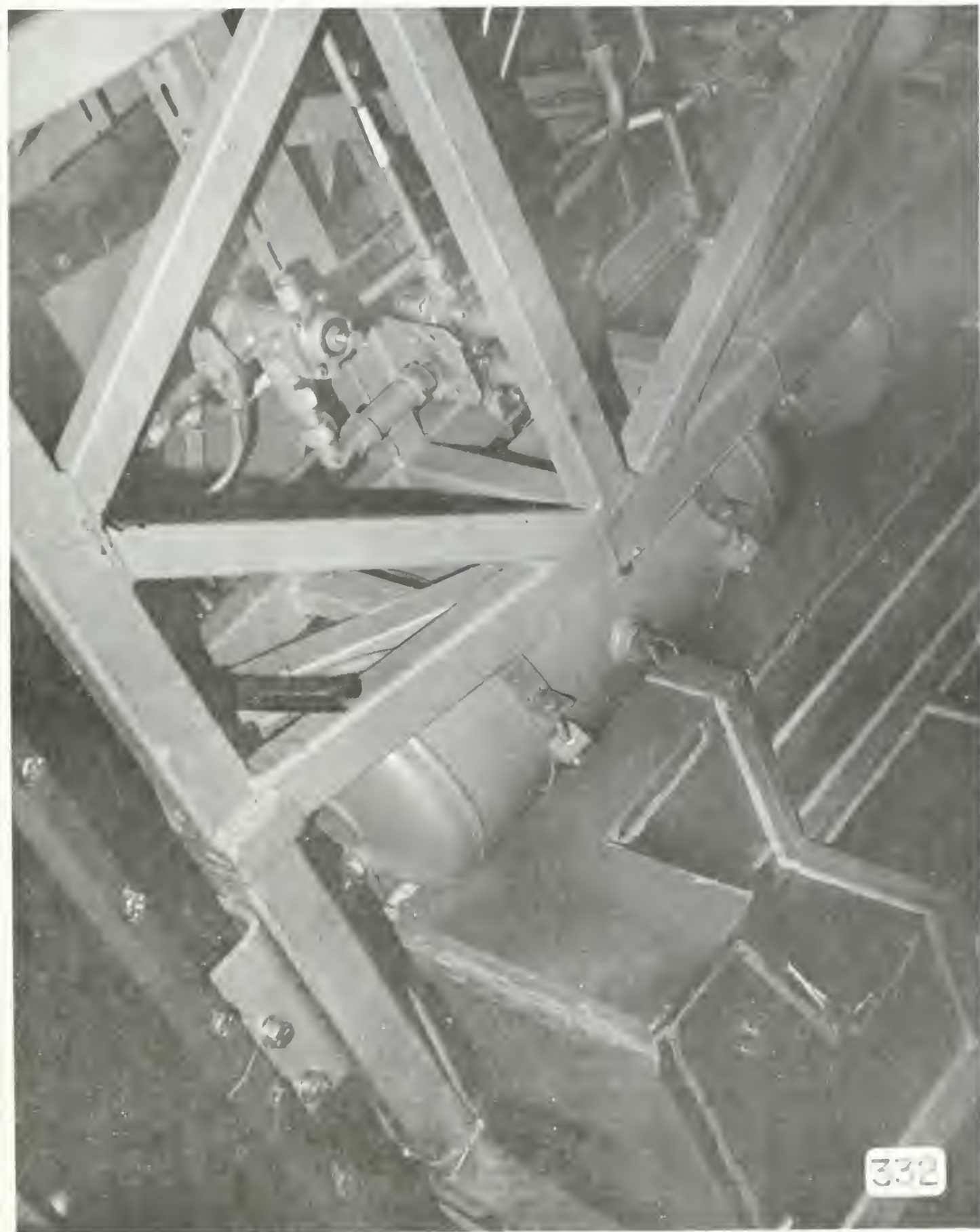


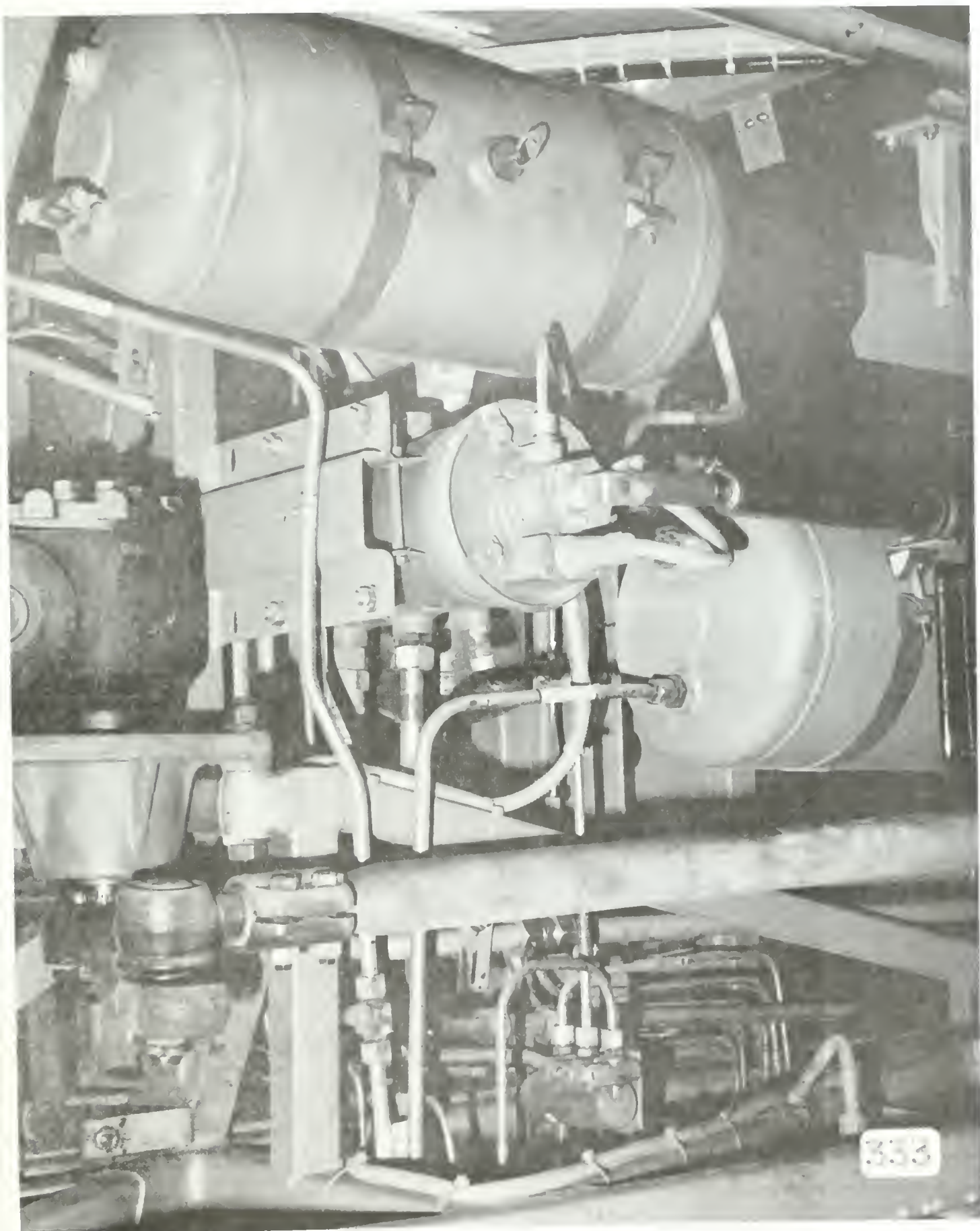
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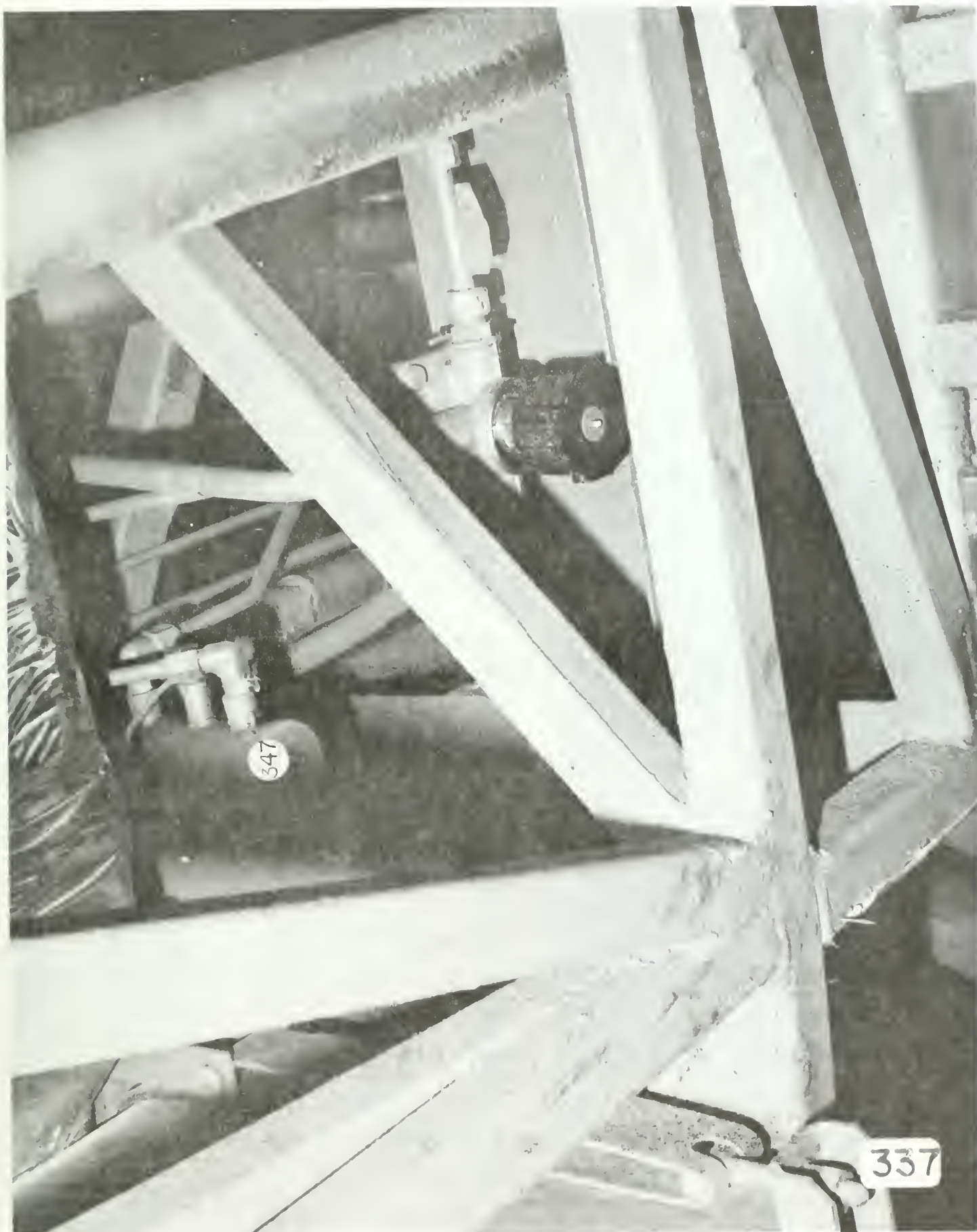


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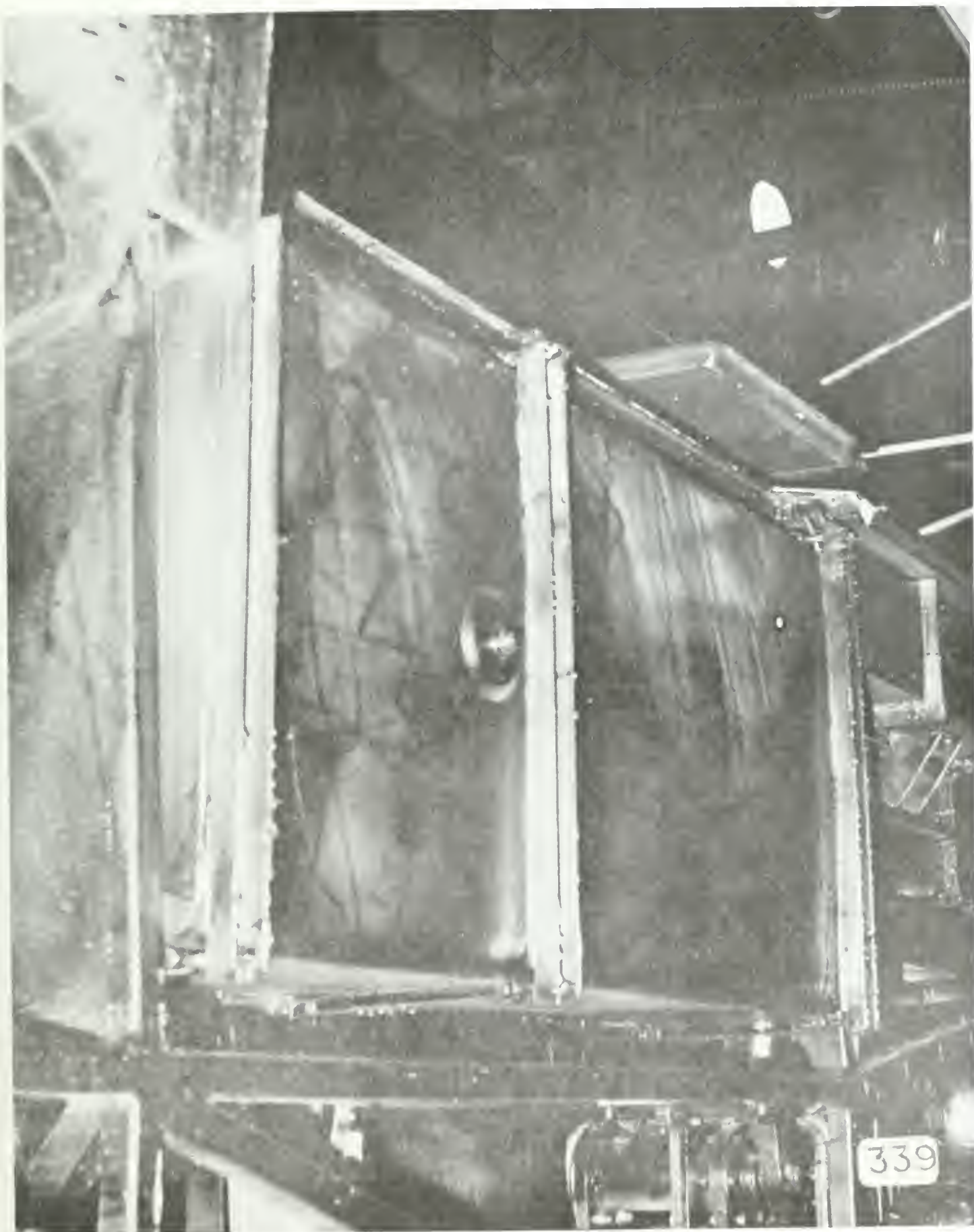


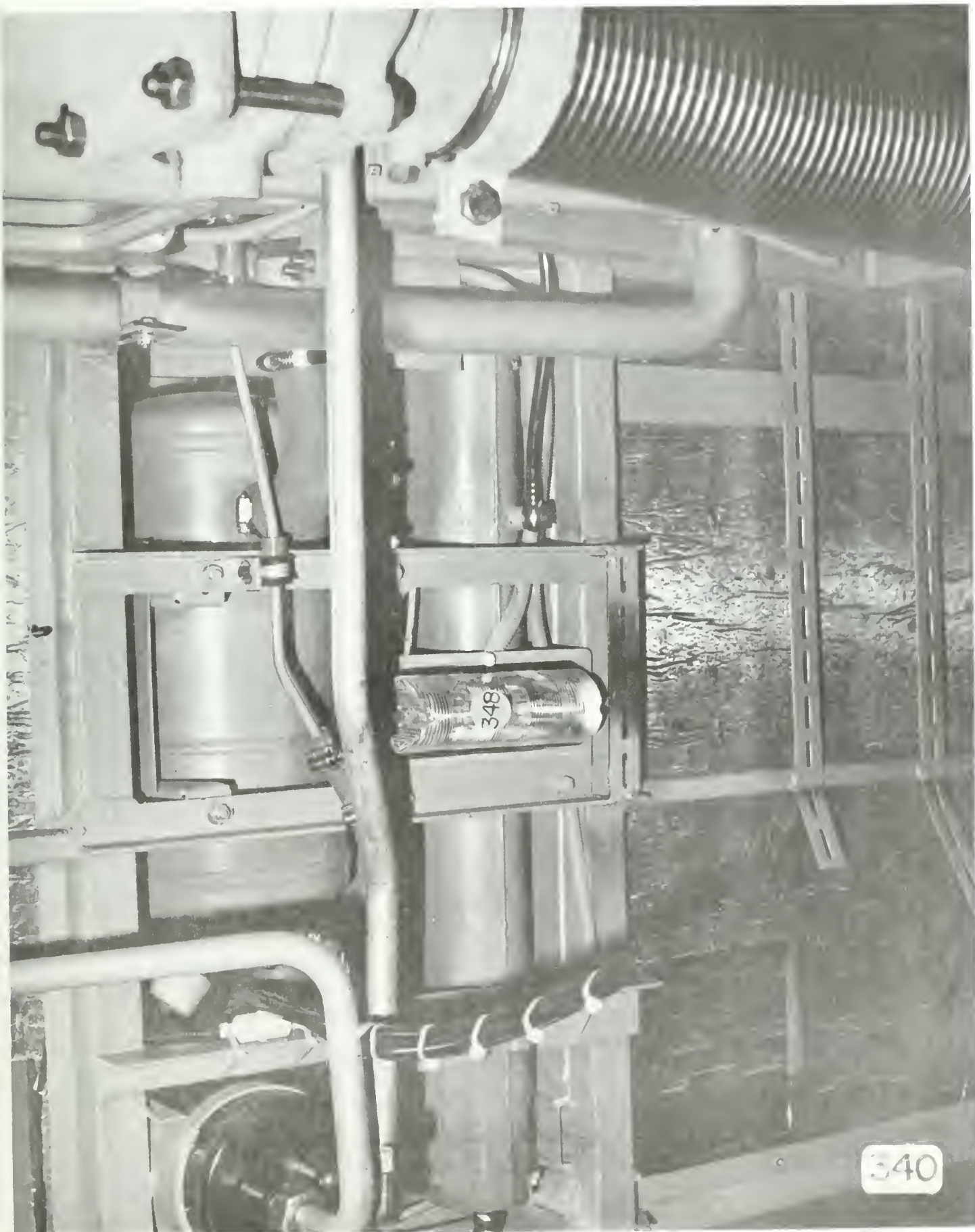


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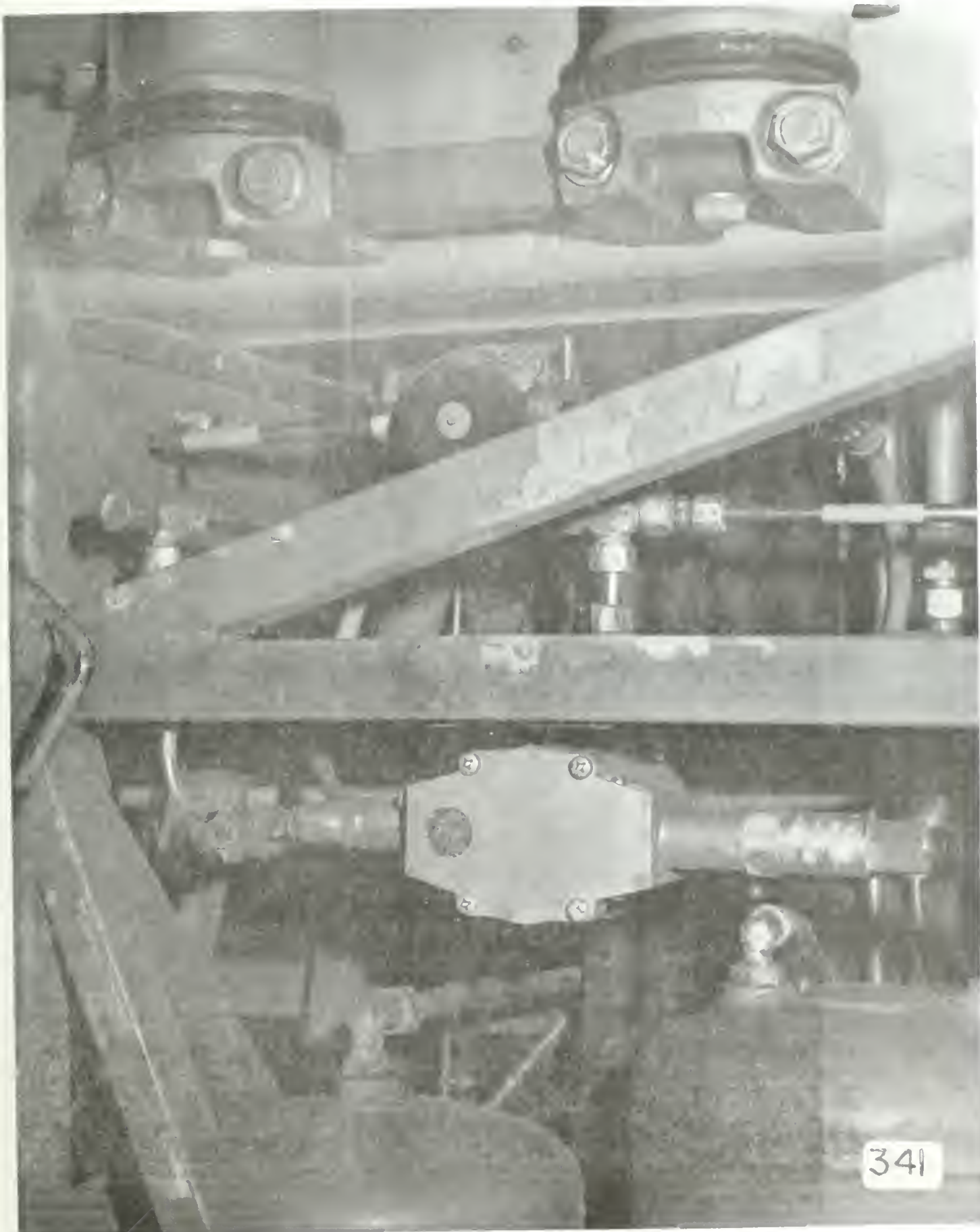




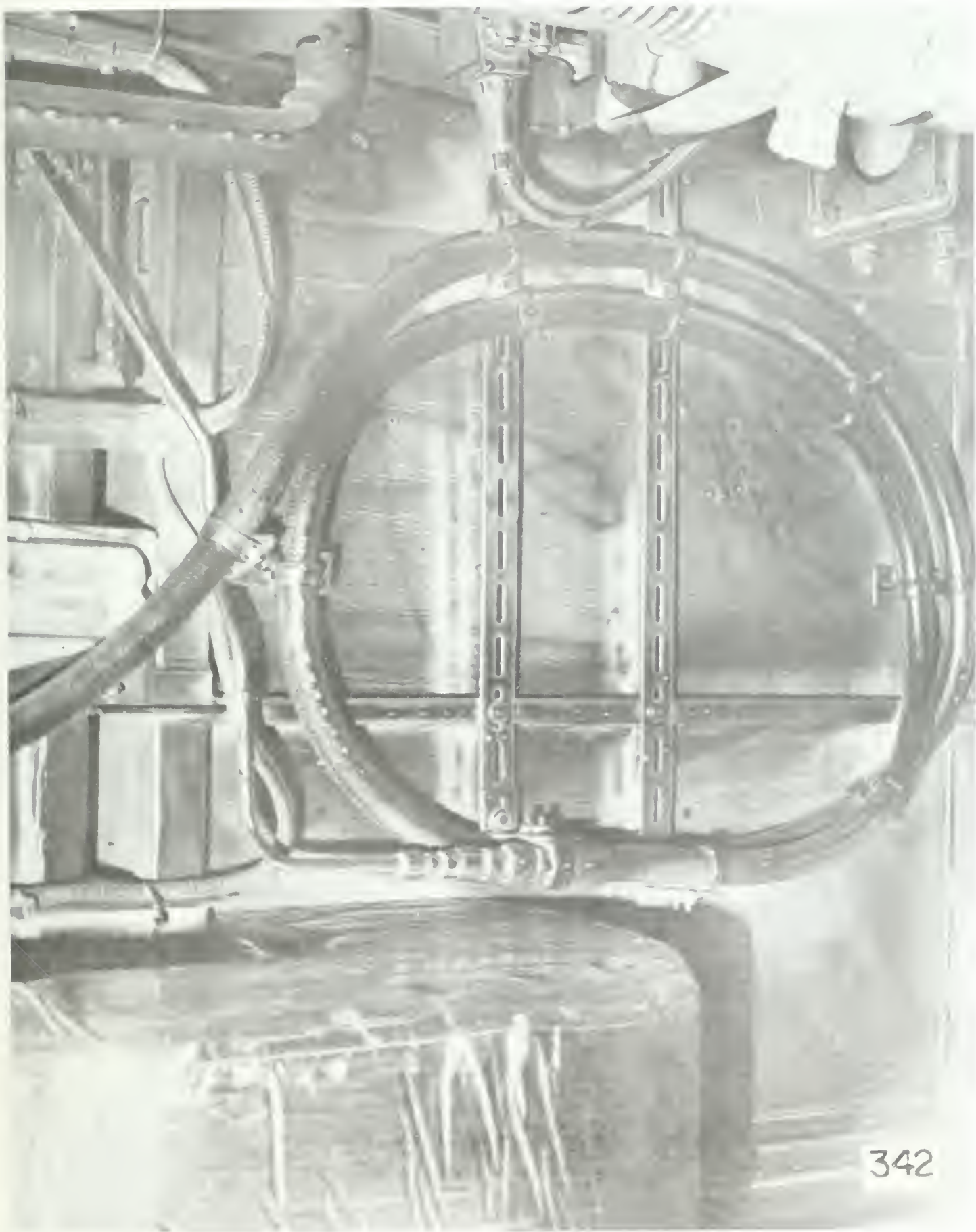




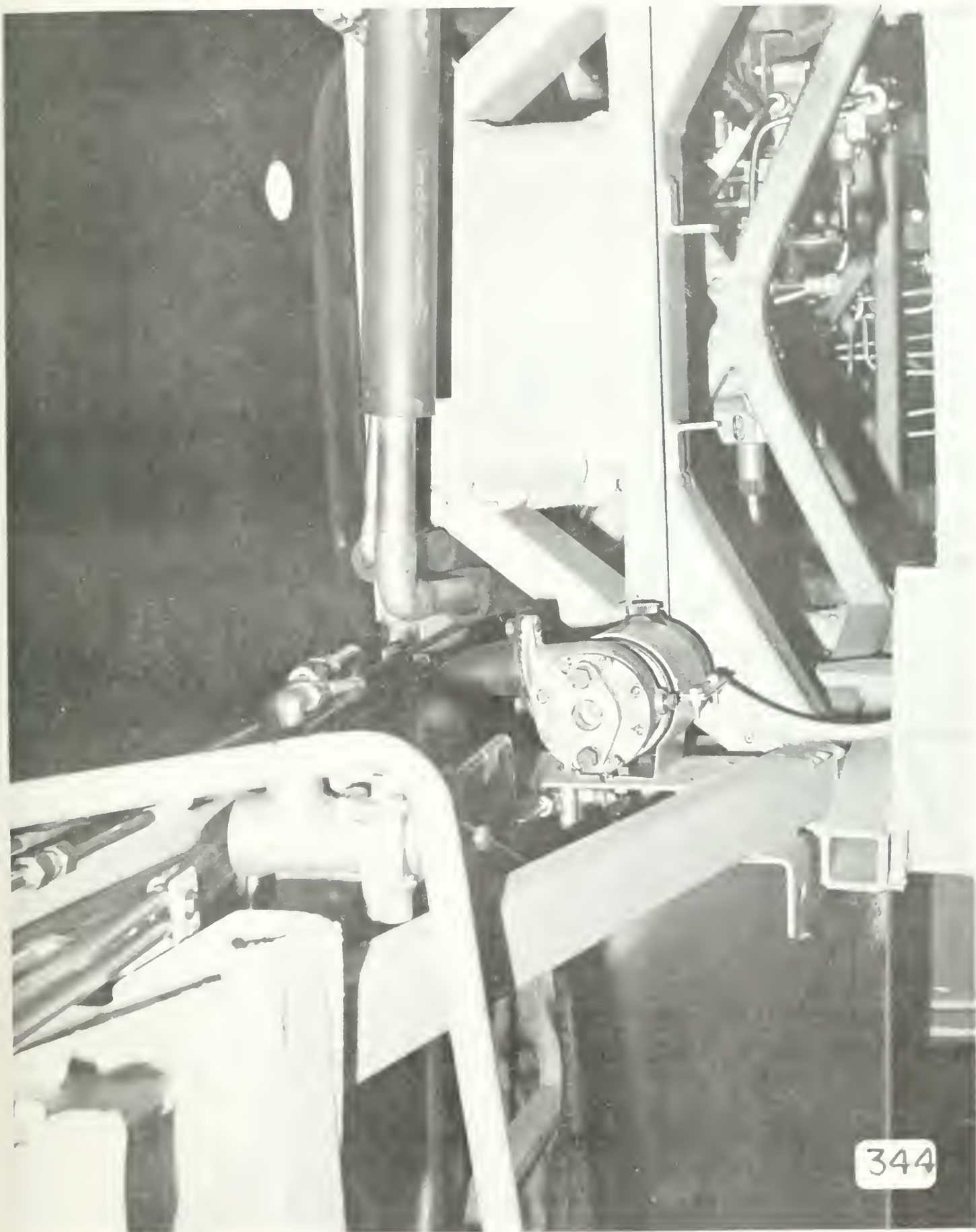
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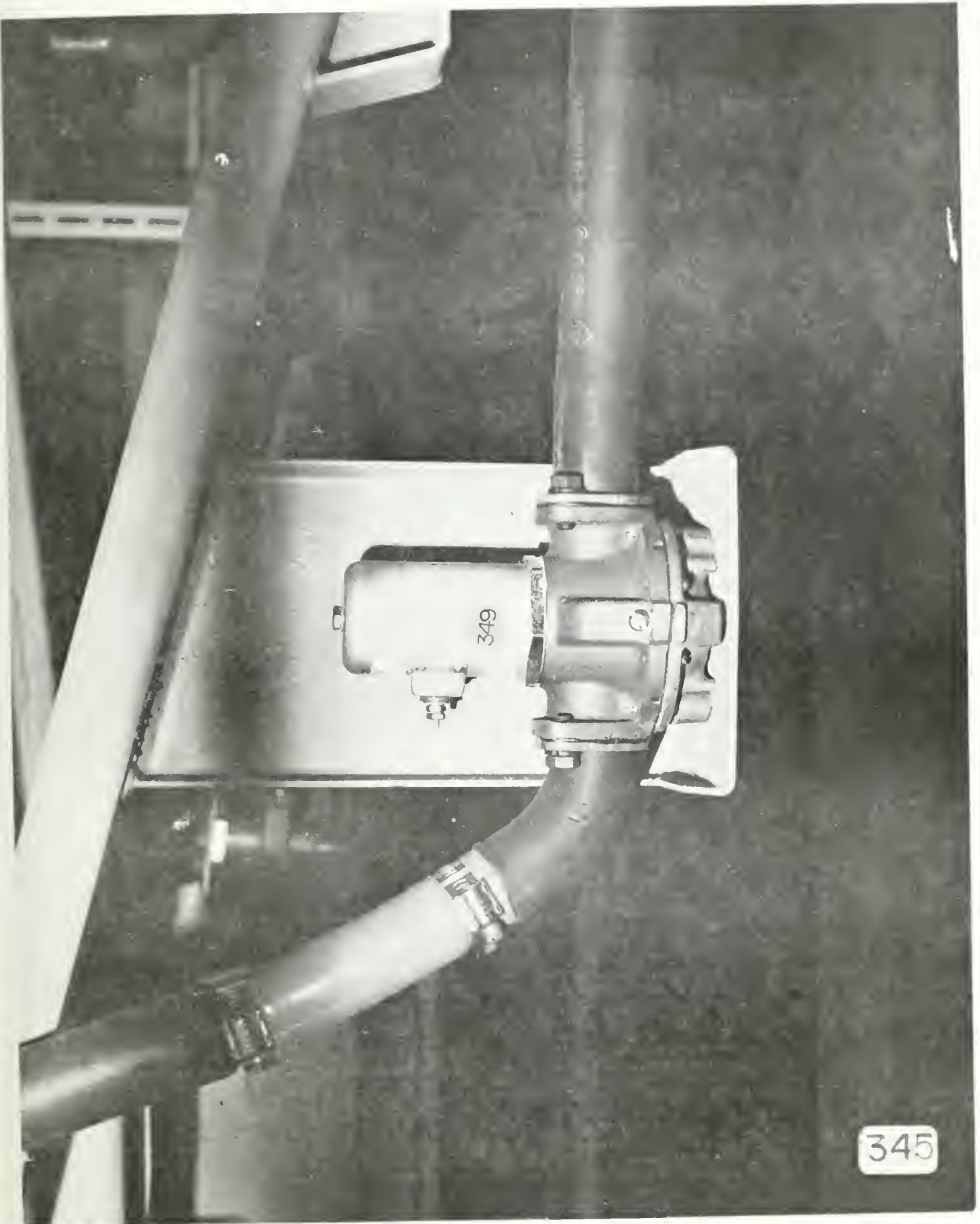


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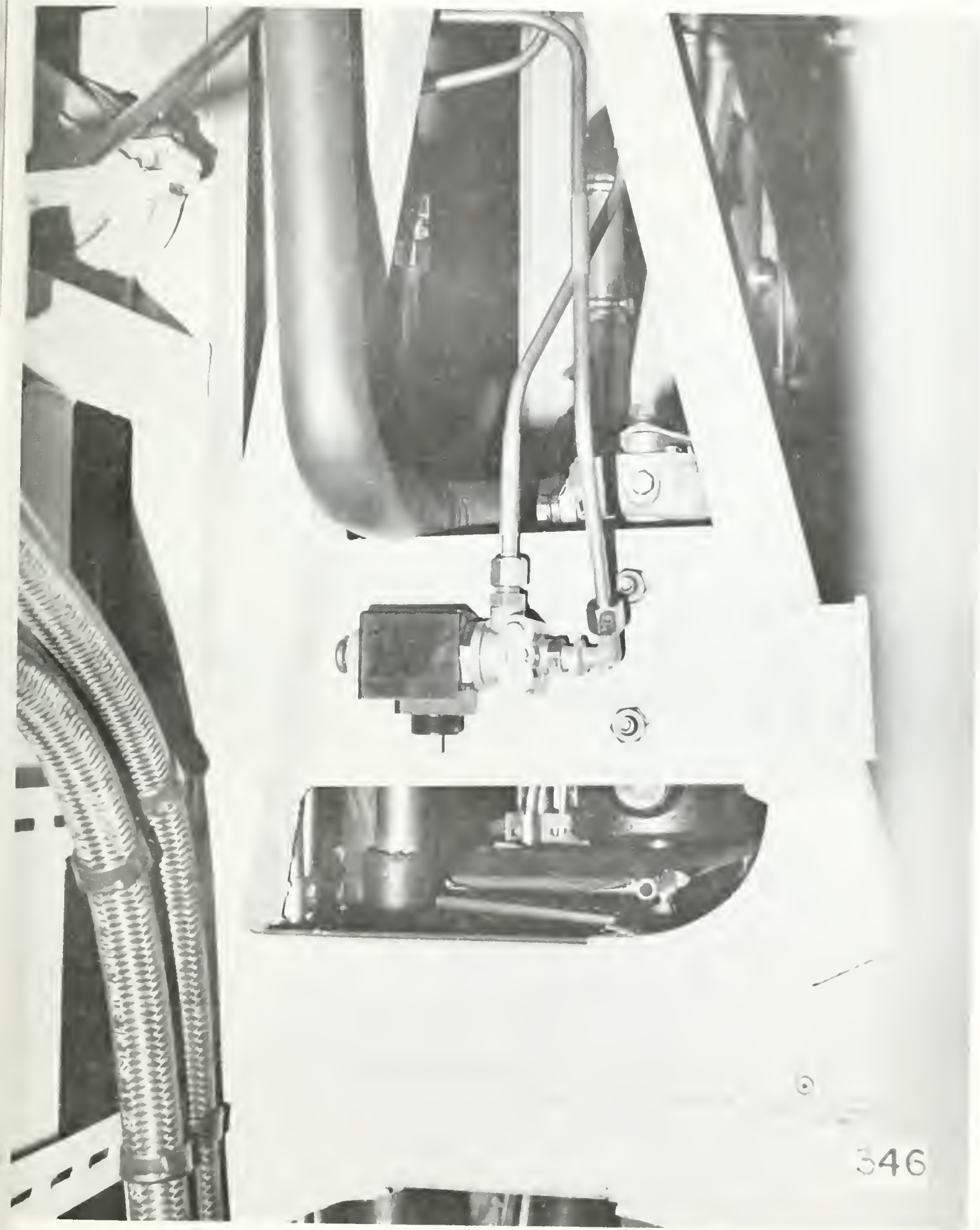








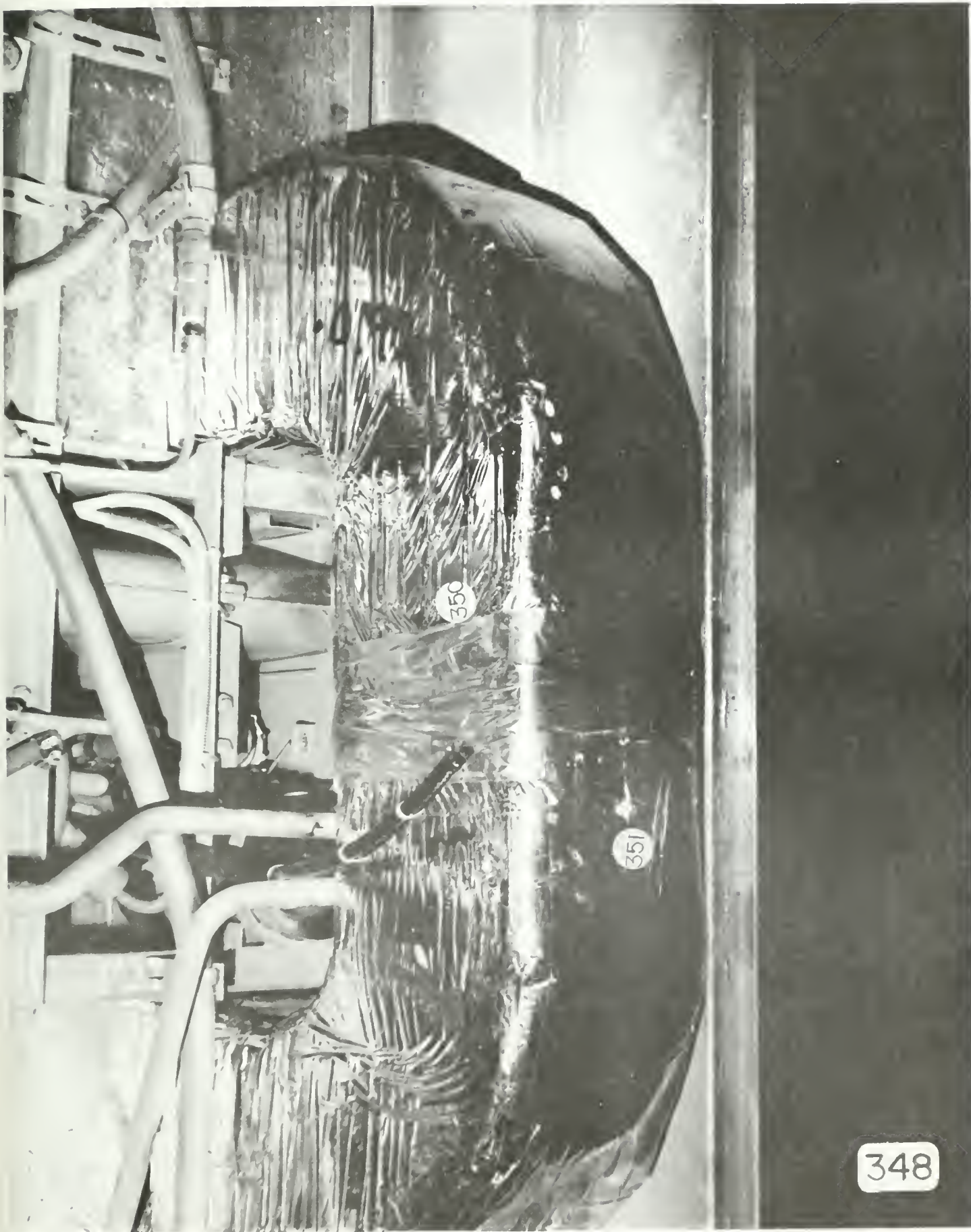
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